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2000 Health Care Survey of DoD Beneficiaries:

Adult Codebook and User's Guide

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Chapter 1

Introduction

This Codebook and Users' Guide provides programmers and analysts with a tool to assist them in creating their own cross-tabulations and basic statistical estimates using the 2000 Adult Health Care Survey of DoD Beneficiaries (HCSDB). It is intended for users wanting to create tables and to perform analyses other than those in the reports associated with this project.

This version of the Codebook and User's Guide describes two data sets: the fourth quarter data set and the combined annual data set. Data sets from Quarters I, II, and III are presented in separate codebooks and are available from TRICARE Management Activity. Like the codebooks from the previous three quarters, this version presents the frequency counts of all variables from the fourth quarter survey. This section compares the fourth quarter data set with frequency counts and percent occurrences of the survey variables from the previous three quarters. The second data set described in this version of the codebook is the combined annual data set. The combined annual data set combines responses from all four quarters and late arriving responses from surveys fielded in the first three quarters.

Any user who wishes to recreate specific tables or charts from the analytic report should also refer to "The 2000 Health Care Survey of DoD Beneficiaries: Adult Technical Manual." That document outlines the procedures required to reproduce the TRICARE Consumer Reports and charts for the National Executive Summary Report using HCSDB data.

This chapter explains how to use this guide, reviews the survey, briefly describes the sample design, and concludes with a list of other documents on the HCSDB data that may be useful for policymakers, administrators, or other users.

How to Use This Guide

Chapter 2 describes the database conventions and types of variables in the database. This chapter explains the relationship of the raw survey data to the cleaned and constructed variables preferred for data analyses.

Chapter 3 provides table-making instructions in both SAS and SPSS, presenting the basic computer programming code needed to tabulate the data in SAS and the interactive steps for generating tables in SPSS. Either package may be used. While we assume that most users have some knowledge of computer systems and statistical processing, examples of how to create tables and the resulting output are given to simplify the process of tabulating the data. Because of the complex sample design, users interested in measuring the precision of their results will need to use a statistical package capable of calculating standard errors for survey estimates, such as SUDAAN™ or WesVar PC®. Sample programming code is included to estimate standard errors using methods that are appropriate for the complex sample design.

Chapter 4 is the codebook describing each variable in the database, including a list of all possible values of the variable, weighted and unweighted frequency counts and percent occurrences for each value, and the values' interpretation or formatting. The codebook helps users assess the availability of certain measures, specify variables of interest, and identify all possible values of a variable. The variables are listed in the order of their position on the data file, where they are grouped according to source as follows:

- Sampling variables used to place beneficiaries in appropriate strata
- Information from the Defense Enrollment Eligibility Reporting System (DEERS) at the time of sampling
- Questionnaire responses: cleaned and recoded
- Variables created during the fielding of the survey
- Coding Scheme flags and missing value counts
- Constructed variables for analysis

We also provide an alphabetical quick-reference list to help the user locate each variable after the table of contents.

Users who wish to know more about the technical aspects of the database creation, construction of new variables, or MPR's report production procedures should refer to "The 2000 Health Care Survey of DoD Beneficiaries: Adult Technical Manual," available from the TRICARE Management Activity Office.

What is the HCSDB?

The HCSDB is a health care survey of active duty military personnel, retirees, and their adult family members. It is fielded to a representative sample of beneficiaries. Results from each quarter will be presented as a web-based report. A child survey is fielded in the third quarter. The survey is sponsored by the Assistant Secretary of Defense (Health Affairs) [OASD (HA)], under authority of the National Defense Authorization Act for Fiscal Year 1993 (P.L. 102-484). The adult survey is intended to assess beneficiaries' satisfaction with and access to health care, knowledge of the TRICARE system, and use of preventive and other health care services.

Until this year, the HCSDB was fielded at yearly intervals. The 2000 HCSDB is fielded in each quarter of 2001, and consists of an unchanging core questionnaire, with different supplements. Results from each quarter are presented in a web-based report. A child survey is fielded in the third quarter.

The annotated questionnaires appear as Appendix A. A crosswalk between the 2000 questions and the questions from the 1994-1995, 1996, 1997, 1998, and 1999 surveys appears as Appendix B.

The HCSDB covers the following topics:

- **Health Plan.** This section collects data on TRICARE Prime enrollment and the use of supplemental insurance and/or other private insurance.
- **Your Personal Doctor or Nurse.** In this section, respondents are asked about their relationship with their personal doctor or nurse. They are asked to rate their personal doctor or nurse on a scale from 0 to 10 where 0 is the worst and 10 is the best.
- **Getting Health Care from a Specialist.** This section collects information about respondents' need for and access to care from specialists. Respondents rate the specialist that they see most frequently on a scale from 0 to 10 where 0 is the worst and 10 is the best.
- **Calling Doctors' Offices.** Questions in this section ask beneficiaries whether they were able to access care and obtain information by telephone from their doctor's office or clinic.
- **Your Health Care in the Last 12 Months.** This section collects information on where DoD beneficiaries received most of their care in the past 12 months. These are questions on both military

and civilian care. This section also contains questions about general and specific aspects of care at the facility respondents used the most; these questions cover topics such as availability of providers and their staff, convenience, and courtesy and respect shown by providers and their staff. These questions are similar in content and format to questions in the Consumer Assessment of Health Plans Survey (CAHPS). CAHPS is a survey program sponsored by the Agency for Health Care Research and Quality (AHRQ) U.S. Department of Health and Human Service, and the Picker Institute. The program is designed to monitor the satisfaction and access of civilian health care plan beneficiaries.

- **Your Health Plan.** This section is designed to measure satisfaction with one's primary health plan. Respondents are asked to rate their health plan on a scale of 0 to 10 where 0 is the worst and 10 is the best. TRICARE Prime enrollees are asked about their satisfaction with Prime and about the possibility of disenrolling. Those not currently enrolled in Prime are asked if they intend to enroll in the next 12 months. All respondents are asked about out-of-pocket expenses for medical care and health insurance coverage. Additionally, respondents are asked questions on problems with claims processing, finding and understanding written materials, customer service, processing paperwork, and resolving complaints.

- **Your Preventive Health Care.** This section collects information on the use of preventive health care services, including routine physical examination, blood pressure readings, cholesterol screening, and flu shots. All women are asked about Pap smears; women that are or have been pregnant within the past 12 months are questioned about prenatal care. Women age 40 and over are asked about mammography and breast examination by a health care professional. Men are asked about prostate examinations. All respondents are asked whether they smoke. Smokers are asked whether they have received smoking cessation counseling from a health care professional.

Quarter I Supplement

- **Chronic Conditions.** Questions in this supplement were used to assess chronic conditions in the MHS population. Respondents were asked about their experiences with obtaining special medical equipment, special therapy or assistance with personal care needs.

Quarter II Supplements

- **Behavioral Health.** Questions in this supplement ask beneficiaries if they had problems getting treatment or counseling for behavioral health problems, and to rate treatment or counseling they received.

- **Beneficiaries Eligible for Medicare.** Questions in this supplement ask beneficiaries age 65 and over about their current medical conditions, health insurance coverage, and use of MTFs. Additional questions ask about how beneficiaries plan to change coverage and MTF use in response to new benefits available through the National Defense Authorization Act of 2000.

Quarter III Supplement

- **TRICARE Claims Processing.** Questions in this supplement ask beneficiaries about their experience with TRICARE claims, bills, and Explanations of Benefits (EOBs). Beneficiaries are asked if they have experienced debt collection or credit problems as a result of TRICARE claims, whom they have contacted to resolve these problems, and whether beneficiaries found these contacts to be helpful.

Quarter IV Supplement

- **Health Status.** This supplement measures the respondent's self-perceived health status. These questions are based on the eight-item SF-8 battery of questions developed by the Medical Outcomes Trust. The summary scales measure physical and mental health components and eight health subscales, including physical functioning, role-physical, bodily-pain, general health, vitality, social functioning, role-emotional, and mental health.

- **Medicare Coverage.** Three supplemental questions were added to clarify beneficiaries medicare coverage. Beneficiaries are asked whether they are covered by Part A, Part B and supplemental medicare coverage.

Sample Design Overview

The sample of beneficiaries for the HCSDB was drawn each quarter from an extract file of the DEERS database of military health system (MHS) beneficiaries with reference dates of July 31, 2000, September 30, 2000, January 31, 2001 and March 31, 2001. The DEERS extract file includes all eligible MHS beneficiaries as follows:

- Everyone in the Uniformed Services and on active duty (Army, Air Force, Navy, Marine Corps, Coast Guard, the Commissioned Corps of the Public Health Service, National Oceanic and Atmospheric Administration, Guard/Reserve personnel who are activated for a period in excess of 30 days, and other special categories of people who qualify for benefits)
- Those who retired from military careers
- Immediate family members of people in the previous two categories
- Surviving family members.

A stratified probability sample design was used to select DoD health care beneficiaries for each quarter of 2000 Adult HCSDB. Strata were defined by a combination of enrollment status groups, and beneficiary groups, and geographic areas. Specific information on the sample design appears in, "The 2000 Health Care Survey of DoD Beneficiaries: Adult Sample Design", Mathematica Policy Research, Washington, D.C.

Each quarter, 45,000 beneficiaries were sampled and sent a 2000 Adult HCSDB questionnaire. In Quarter I, of the 45,000 beneficiaries sampled, 13,843 adult MHS beneficiaries completed and returned a 2000 Adult HCSDB questionnaire, yielding a response rate of 31%. Quarter II generated a 33% response rate, with 14,629 adult beneficiaries completing and returning the Adult HCSDB questionnaire. In Quarters III and IV, 14,902 and 14,888 adult beneficiaries completed and returned questionnaires, respectively, yielding a response rate of 33.3 % each quarter.

These response rates do not include late arriving responses from the surveys fielded in the first three quarters. These response rates are based on the number of completed surveys returned to the survey vendor at the end of the fielding period. The annual combined data set includes the surveys returned after the end of the fielding period. The quarterly response rates were subsequently recalculated. The revised response rate for Quarter I is 33.7%. For Quarter II, the final response rate is 36.1%. The response rates for Quarters III and IV are 33.3 and 34.5%, respectively. For further discussion of response rates, please refer to "The 2000 Health Care Survey of DoD Beneficiaries: Adult Technical Manual", Mathematica Policy Research, Inc., Washington D.C.

Other Documents on the 2000 HCSDB

This document is intended for programmers and analysts using the 2000 Adult HCSDB data. Following is a list of other documents that may be requested from the TRICARE Management Activity Office:

- The 2000 Health Care Survey of DoD Beneficiaries: Adult Sample Design
- The 2000 Health Care Survey of DoD Beneficiaries: Adult Technical Manual
- The 2000 Health Care Survey of DoD Beneficiaries: National Executive Summary Report

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Chapter
2

Description of the Adult HCSDB Database

This chapter presents the procedures for developing the database, and presents the database file layout.

Variable Naming Conventions

The conventions used to name variables on the 2000 Adult HCSDB data file are listed below and summarized in Table 2.1. The naming conventions remain constant across the four quarters of the 2000 HCSDB.

- **Survey Variables**. Core survey variable names consist of up to eight alphanumeric characters that start with an alpha character ("H" for Adult survey variables), followed by a year designation ("00") and ending with three numbers and, if necessary, one alpha character to identify the relevant survey question. For example, the variable representing the first question of the Quarter III survey is given the name H00001. Recoded variables have the same names as on the survey. The original variables are suffixed with "_O"; these will not be on the public release file.

- **Supplemental Question Variables.** Each quarter, the questionnaire will include a battery of questions on specific health care topics concerning services offered to MHS beneficiaries. The supplements in the first two quarters contained questions to assess chronic conditions in the MHS population, determine access to and quality of mental health services and current and planned utilization of MTFs by beneficiaries age 65 and older. Like the core questions, supplemental questions also include eight alphanumeric characters; each variable begins with an "S" to distinguish it as a supplemental question, followed by the year designation ("00"). The variable ends with an alpha character and the question number in the supplemental series. For example, the variable for the first supplemental question would be S00H01. In Quarter III, the supplemental question variables have an "H" in the fourth position; for example S00H01, ask about beneficiaries' experiences with TRICARE claims processing.

- **Self-Reported Data**. Defense Manpower Data Center (DMDC) standard demographic self-reporting variables on the adult survey are prefixed with "SR." Survey variables with this naming convention include SRRACE (race/ethnicity) and SREDA (education).

- **Coding Scheme Flags and Counts.** Coding Scheme flags, variables N1-27, reference the notes in the Coding Scheme for Adult Survey. N2, for example, is set when checking the values of H00006 and H00007. See Appendix C for the Coding Scheme for each quarter for more information. Coding Scheme counts are sums of missing value responses for each questionnaire; each of these variable names begins with the 4 characters "MISS".

- **Constructed Independent Variables**. Independent variables are prefixed with an "X." These include original survey variables modified as a result of data cleaning or recoding and newly constructed variables that did not previously exist on the survey file. For example, since the variable SRSEX was modified as a result of data cleaning and recoding, it was renamed XSEXA.

- **Constructed Dependent Variables**. Dependent variables are given different prefixes depending on function. Healthy People 2010 variables, for example, are prefixed with an "HP," and all other newly constructed dependent variables are prefixed with a "K."

- **Weighting Variables**. Quarterly weighting variables are prefixed with a "W." Annual weighing variables are prefixed with a "C".

TABLE 2.1

NAMING CONVENTIONS FOR 2000 HCSDB VARIABLES – QUARTERS I-IV
(Variables Representing Survey Questions)

1st Character: Survey Type	2nd – 3rd Characters: Survey Year	4th – 6th Characters: Question #	Additional Characters: Additional Information
H= Health Beneficiaries (18 and older, Adult Questionnaire) ---------- S = Supplemental Question	00	001 to 085 ---------- Quarter I C01-C22 – supplemental questions on chronic conditions. Quarter II M01-M03 – supplemental questions on mental health services; A01-A13 supplemental questions on current use and planned use of MTFs by beneficiaries age 65 and over. Quarter III H01-H15 – supplemental questions on TRICARE claims Quarter IV I01-I03 – supplemental questions on insurance coverage by Medicare; S01-S09 – supplemental questions using the SF-8 battery of health status questions.	A to J are used to label responses associated with a multiple response question _O denotes an original version of a recoded variable ----------

(Constructed Variables)

1st Characters: Variable Group	Additional Characters: Additional Information
SR=Self-reported demographic data	Descriptive text, e.g., SREDA
N=Coding scheme notes	Number referring to Note, e.g., N2
X=Constructed independent variable	Descriptive text, e.g., XREGION
HP=Constructed *Healthy People 2010* variable	Descriptive text, e.g., HP_BP (had blood pressure screening in past two years and know the results)
K=Constructed dependent variables	Descriptive text, e.g., KMILOPQY (total number of outpatient visits to military facility)

Cleaning and Editing Conventions

Data quality procedures are found in the Coding Scheme tables. The complete Coding Scheme appears in Appendix C. It contains detailed instructions for all editing procedures used to correct data inconsistencies and errors. Editing procedures check for appropriate response values and consistent responses throughout the questionnaire. The steps to insure data quality include the following:

- **Initial Cleaning**. Missing value flags were encoded when NRC created the SAS dataset:
  - Skipped items were encoded with SAS missing value code of '.'.
  - Multiple responses, where there should be a single response, were encoded with SAS missing value '.A'.
  - Incomplete grid responses were encoded as SAS missing value '.I' with two exceptions: 1) If there was a response in the right column(s) and none in the left column(s), the missing grids were zero-filled; 2) if there was a response in the left column(s) and none in the right column(s), the field was right-adjusted and then zero-filled.
- **Data Cleaning and Recoding of Variables – Implementation of the Coding Scheme.** Skip patterns were checked for consistency, and questions that were skipped legitimately were recoded with the SAS missing value of ".N"; questions that were answered, but should have been skipped, were recoded with a SAS missing value of ".C". When possible, variables were backward coded or forward coded to make all responses consistent within a sequence. Numeric values were checked, and values that were out of range were flagged with the SAS missing value of ".O".
- **Frequency Checks**. Formatted and unformatted frequency tables for all variables in the 2000 Adult HCSDB Quarters I through IV and the annual data file appear in Chapter 4 of this document. These frequency tables and other relevant cross tabulations were used to examine the range of values recorded for each data item to determine the type and magnitude of missing values. All value labels have been checked for accuracy.

Record Selection Criteria

Blank returns, nonrespondents, and any respondents found to be ineligible for MHS benefits were removed from the database. In addition, among eligible respondents with a non-blank questionnaire, a questionnaire must be "complete" to be included in the database.

To determine if a questionnaire is "complete", 29 key questions were chosen. These key questions were adapted from the complete questionnaire rule developed by AHRQ for CAHPS surveys. At least 50 percent of these key items (fifteen or more) must be answered for a questionnaire to be accepted as a complete questionnaire. The key survey variables are: H00006, H00007, H00008, H00009, H00010, H00011, H00013, H00015, H00016, H00018, H00019, H00020, H00023, H00024, H00026, H00027, H00028, H00030, H00037, H00042, H00047, H00049, H00054, H00056, H00077, SREDA, H00079, SRRACE and SRAGE.

Weighting Procedures

The analysis of survey data from complex sample designs, such as the 2000 Adult HCSDB, requires weights to do the following:

- Compensate for variable probabilities of selection
- Adjust for differential response rates
- Improve the precision of the survey-based estimates through post-stratification [for details, see Brick and Kalton (1996) and references cited therein]

Sampling weights are equivalent to the reciprocal of the probability of each respondent's selection into the sample. Sampling weights are further adjusted for nonresponse within classes defined by sampling strata: a cross-classification of enrollment status, geographic area, and beneficiary group. These nonresponse-adjusted weights are then ratio-adjusted to population counts from the DEERS files to compensate for variations from the estimated population counts. Chapter 4 contains the weighted and unweighted frequencies for each variable in the fourth quarter as well as variables from the first three quarters. The combined annual data set presents the cumulative frequency, weighted and unweighted, of all of the survey variables from all four quarters.

The data sets documented here combines four quarterly data sets and include two sets of weights, quarterly and annual. The quarterly weights, WRWT, are based on the probability of being selected in a particular quarter. The annual weights, CWRWT, are based on the annual probability of selection. Analysts should use annual weights when calculation cumulative statistics, such as an overall average health care rating. They should use quarterly weights when calculating quarterly statistics and when using supplementary questions, which occur only in one quarter.

Chapter
3

Programming Guide

This chapter is designed to help users create tables and variance estimates. Procedures for using SAS, SPSS, SUDAAN, and WesVarPC to create estimates are explained. Examples provided in the text are based on the first quarter of data from the 2000 HCSDB.

How To Make a Table Using SAS

The 2000 Adult HCSDB dataset is provided in a Statistical Analysis System (SAS) 6.0 format. SAS is a computer software system used for data management, summarization, and analysis. Later versions of SAS can also read version 6 datasets. A format library for the adult database is included along with the dataset. SAS can be run interactively or non-interactively (in batch mode), and the sample programs presented here can be run using either method. Special instructions are given later in the chapter for working interactively with the SAS Display Manager System in a Windows environment. All SAS programs generate a LOG and a LST file. The LOG file shows how SAS interprets your program and flags SAS syntax errors. The LST file shows the requested output.

File References, Libraries, and Options

SAS recognizes two types of datasets -- permanent and temporary. Permanent datasets, such as the HCSDB, are located through a LIBNAME that references the directory where the data is stored. For example, if the adult dataset for Quarter III is located on a CD-ROM in the subdirectory HCSDB00\FORMA\Q3, your LIBNAME statement must look like this:

LIBNAME INFORMA 'F:\HCSDB00\FORMA\Q3';

The adult dataset can then be referred to as INFORMA.HCSDB00, where INFORMA is the location of the file HCSDB00.

A format library requires a LIBNAME LIBRARY statement that shows the location of the format library. For example, if the adult format library is stored on your hard drive in a FMTLIB subdirectory, the LIBNAME statement should look like this:

LIBNAME LIBRARY 'C:\HCSDB00\FORMA\Q3\FMTLIB';

The OPTIONS statement controls page format and line length. A table with a “portrait” orientation might have this statement:

OPTIONS PS=79 LS=132;

A table with a “landscape” orientation that is left justified would have this OPTIONS statement:

OPTIONS PS=50 LS=175 NOCENTER;

DATA Step

The DATA step is used to create permanent or temporary datasets. It is also used to create new variables, modify existing variables, and limit the number of variables or observations. In a DATA step, you can do any or all of the following activities:

✍ Construct new variables. For example, to construct a variable of active duty by sex:

```
/*  Active duty males   */
IF XSEXA = 1 AND XBNFGRP = 1 THEN XSEX_AD = 1;
*  Active duty females;
ELSE IF XSEXA = 2 and XBNFGRP = 1 THEN XSEX_AD = 2;
ELSE XSEX_AD = .;   /*  missing value  */
```

[Note: the two methods to insert comments: enclosed within /* */ or beginning with * and ending with a semicolon]

✍ Modify existing variables. For example, if the respondent is in region 7, the respondent will be placed in the combined region 7/8:

```
IF XREGION = 7 THEN XREGION = 8
```

✍ Limit the number of variables. Use a KEEP statement:

```
KEEP XREGION CACSMPL H00056 H00077;
```

✍ Limit the number of observations. Use a subsetting IF:

```
/*  Keep only region 3 observations  */
IF XREGION = 3;
```

✍ Create a new temporary dataset. For example, CAC_1 is a temporary file of observations for only those respondents in catchment area 1:

```
LIBNAME INFORMA 'F:\HCSDB00\FORMA';
DATA CAC_1;
/*  Input file is HCSDB00  */
SET INFORMA.HCSDB00;
IF CACSMPL = 1;
RUN;
```

✍ Create a new permanent dataset. For example, OUT.CAC_9901 is a permanent dataset only of Region 1 out-of-catchment respondents:

```
LIBNAME INFORMA 'F:\HCSDB00\FORMA';
LIBNAME OUT 'C:\HCSDB00\FORMA';
DATA OUT.CAC_9901;
SET INFORMA.HCSDB00;
IF CACSMPL = 9901;
RUN;
```

PROC TABULATE

PROC TABULATE produces summary statistics in a table layout. The table can have up to three dimensions: page, row, and column. Within any dimension, multiple variables can be reported one after another or hierarchically. Useful statistics that are available in PROC TABULATE include:

- N number of observations with nonmissing values
- NMISS number of observations with missing values
- MEAN the arithmetic mean
- SUM the sum
- PCTN percent that one frequency represents of another frequency
- PCTSUM percent that one sum represents of another sum

The essential elements to execute PROC TABULATE are outlined below (items within < > are not required):

PROC TABULATE DATA=*your dataset* <option list>;
CLASS *class variables*;
VAR *analysis variables*;
TABLE << *page expression, > row expression, > column expression </ table options* >;
WEIGHT CWRWT;
RUN;

If the input file is to be limited to a specific population, a separate DATA step can precede the TABULATE, or a WHERE statement can be used within the TABULATE procedure. For example, to create a table from only respondents in catchment area 1, you would use the following statement after the PROC TABULATE statement:

WHERE CACSMPL = 1;

CLASS variables are any variables that are used for grouping; variables such as XREGION, XSEXA, and CACSMPL are good examples of class variables. Class variables can be either character or numeric and typically have a discrete number of values. Unless MISSING is specified in the options list in the PROC TABULATE state, any observations with a missing CLASS variable will be dropped from the table.

The VAR statement identifies all analysis variables for a table. Analysis variables must be numeric and can be either discrete or continuous. SAS excludes missing values when computing statistics such as means and percentages.

The WEIGHT statement identifies the numeric variable whose value is used for weighting each *analysis* variable. In the HCSDB for 2000, the weight variable is CWRWT.

The TABLE statement defines the table features. Every variable listed in this statement **must** be classified as either a class variable or an analysis variable in the CLASS or VAR statements. A comma separates each table dimension (page, row, and column). If there are three dimensions, the first is the page, the second is the row, and the last is the column. If there are only two dimensions, the first is the row and the second is the column. Tables with only one dimension are in column form. Each dimension expression is composed of the same following elements:

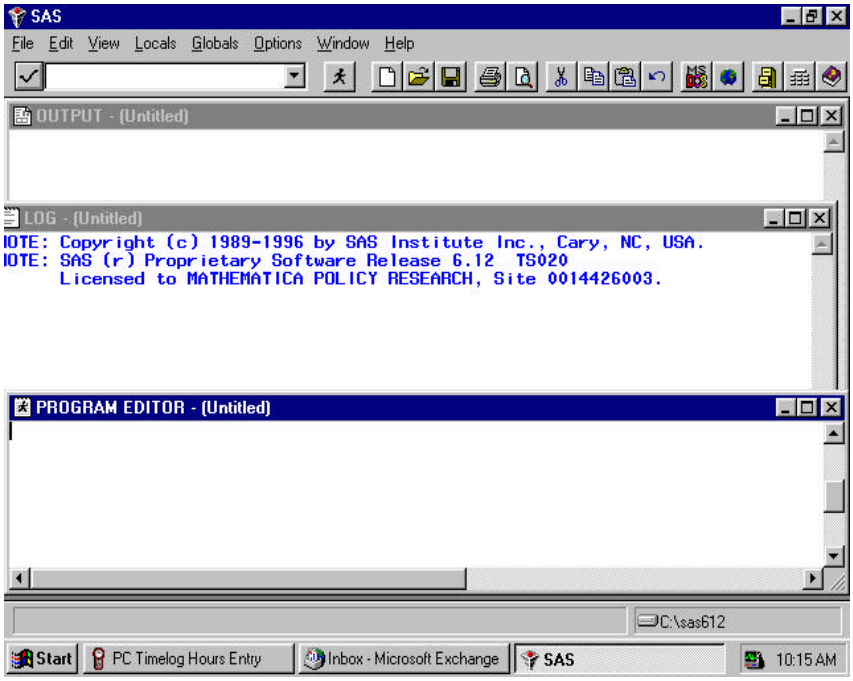
- Analysis variables

- Class variables
- The universal class variable ALL, which summarizes the class variables in the same group or dimension
- Keyword for the statistic to be performed, such as MEAN, SUM, or PCTSUM
- A format modifier, which defines how to format values in cells. For example, F=8.2 will present values with a maximum of 8 positions and 2 digits to the right of the decimal.
- Labels, which temporarily replace variable names and statistic keywords. These labels have the form ='*label*'; for example, XREGION='Region' or MEAN=' ' (to eliminate the word MEAN from the headings).
- Crossing operator * (asterisk). The asterisk is used to cross elements within the same dimension. For example, you would use XENRLLMT*XSEXA to cross enrollment status by sex. The asterisk is also used to connect the statistic (e.g., MEAN, SUM) to the appropriate dimension; for example, to calculate the mean of respondents' satisfaction with all health care in the last 12 months, you would use H00037 *MEAN.
- Denominator definitions are enclosed by < > (brackets).
- Concatenation operator is a single space between elements in a dimension. For example, to concatenate satisfaction with all health care in the last 12 months with satisfaction with health plan, you would use H00037 H00056.
- Grouping is accomplished with parentheses. Below is an example of grouping, concatenation, and crossing within a single dimension:

  (XBNFGRP ALL)*XSEXA

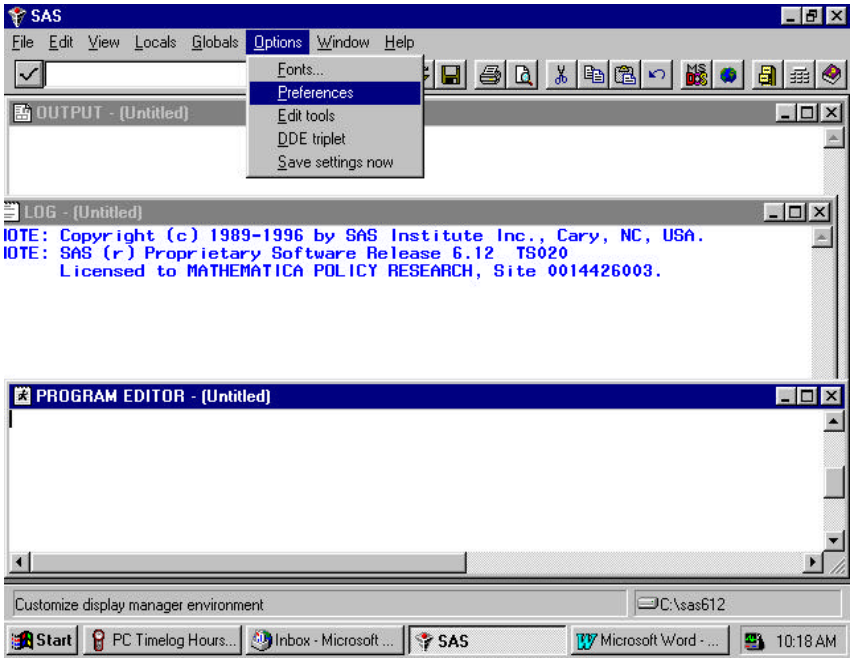
The SAS Display Manager System

The SAS Display Manager system provides an interactive tool for running SAS commands, like those given above, in the Windows environment. Double clicking the SAS icon on the desktop begins the SAS session. When you first enter the system, the following screen opens.

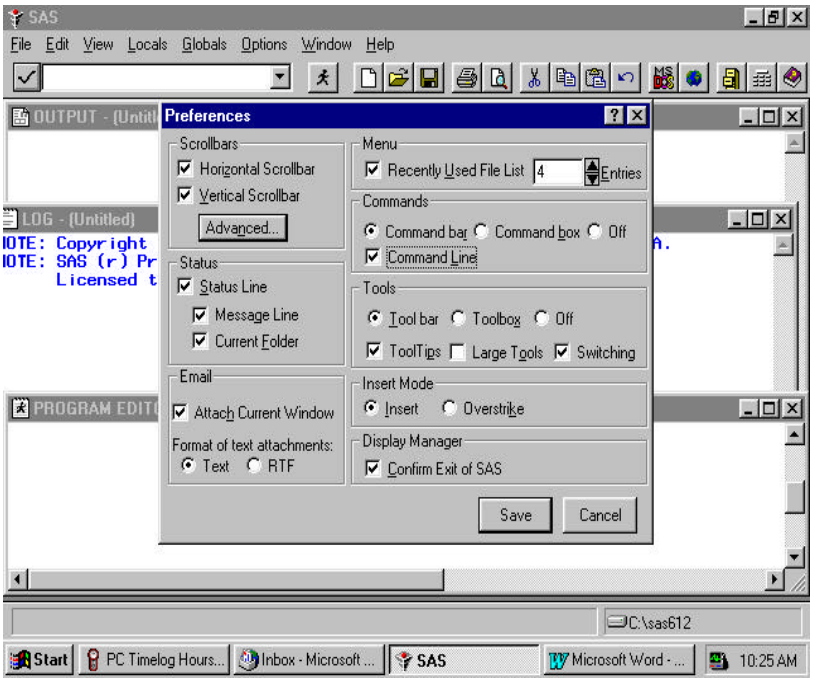


The screen is divided into three windows, each corresponding to an aspect of your SAS session. The Program Editor is the window where you compose, edit, and run your SAS commands. The Log window displays messages from the SAS system as well as your SAS statements as they are executed. Any error messages appear in the Log. The Output window displays the output tables requested in procedure commands written in the Program Editor. Toggling among the windows is accomplished by clicking anywhere in a given window. The cursor will jump to the selected window. Below are some options for customizing these screens by defining Preferences.

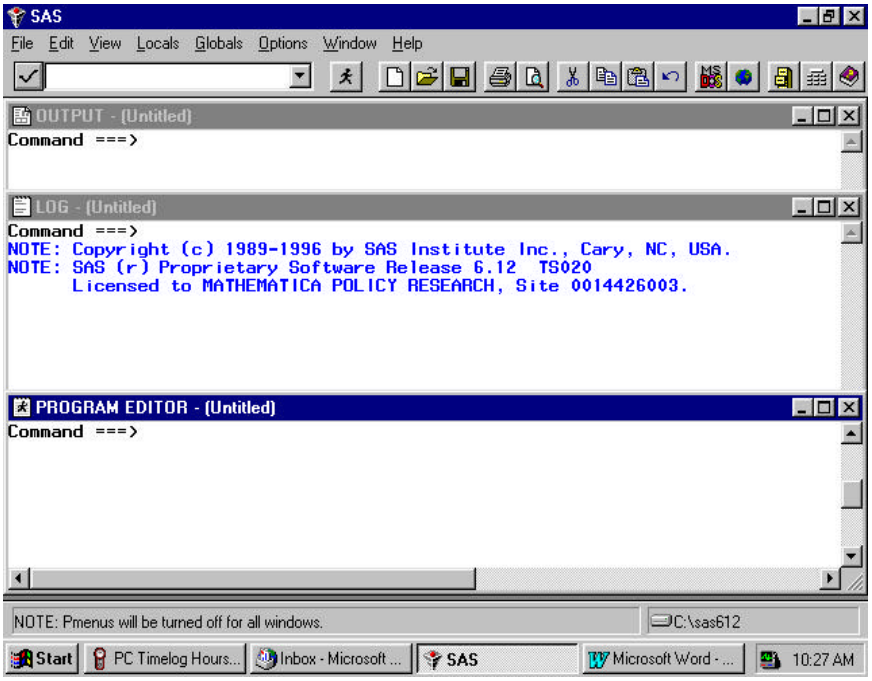
Clicking on **Options** results in the following screen.



Click on Preferences as highlighted above, and the following screen will open.



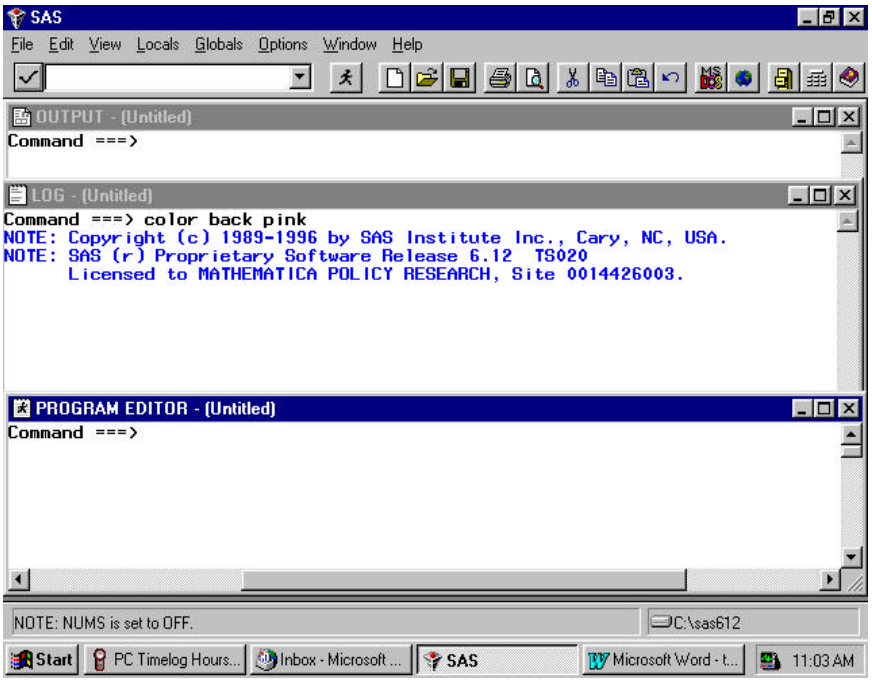
Many of these settings are system default options. To add a command line to the three windows, you would click in the box opposite **Command Line,** causing a check mark to appear in the box. Your screen should resemble the screen above. Click on **Save** and the screen will change to the following.



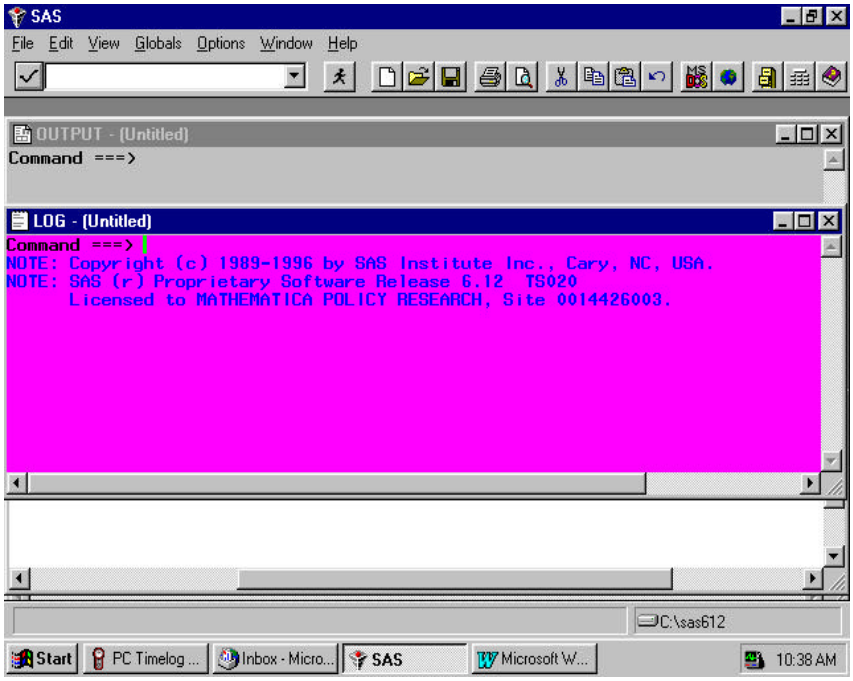
Each window shows the word **Command** followed by an arrow. Commands may be typed at this location. To arrive at the command line, depress the **Home** button on your keyboard. The cursor will appear opposite the arrow.

Toggling among the windows may be accomplished by typing the desired window name at the command line and pressing **Enter**. SAS recognizes **Pgm** as the abbreviated reference to the Program Editor and **Out** as a shortened name for the Output window. A few keystrokes allows you to navigate among the windows. For example, the command line lets you continue to customize our SAS session as follows.

In order to more easily distinguish between the SAS windows, it may be preferable to change the background color of selected windows. As an example, set the background color of the Log window to pink and the Output window to gray. Press the **Home** key to arrive at the command line. Type **Log** opposite the arrow to toggle to the Log window. Type the command, ***color back pink*** (or some other color) on the command line. Your screen will resemble the following.



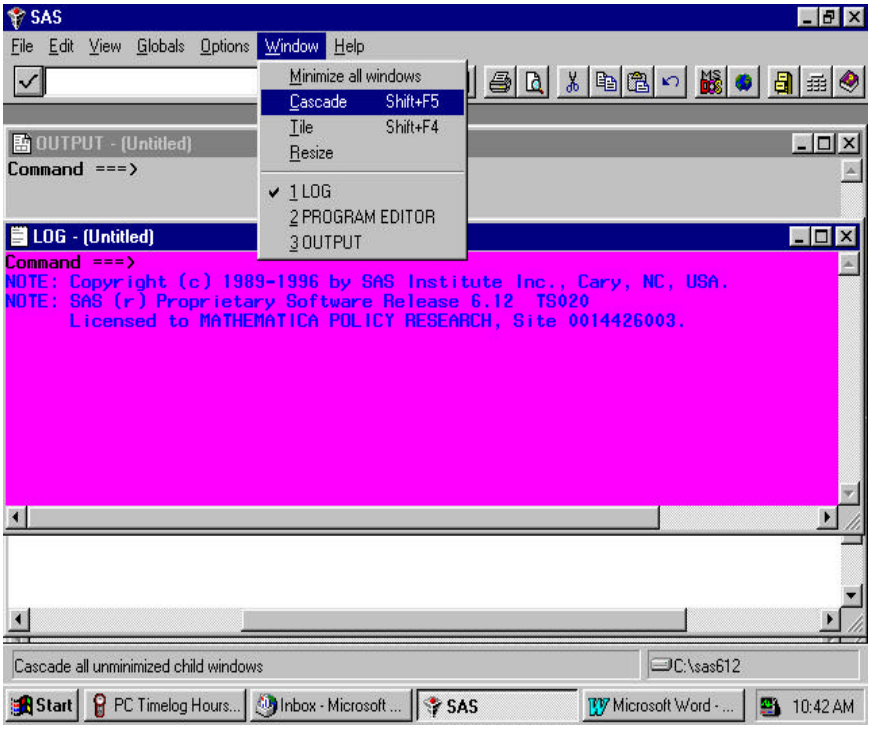
Press **Enter** to process the commands and the window will shade to pink. Toggle to the Output window by typing **Out** and keying **Enter**. Type ***color back gray*** and key **Enter**. These changes make it easier to distinguish between the windows at a glance. The screen looks like the following.



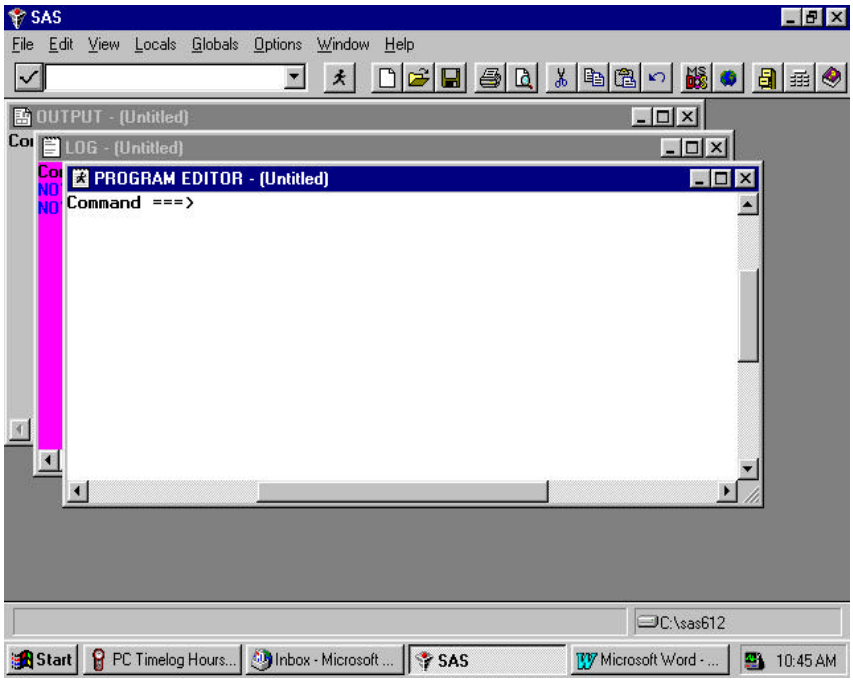
All SAS statements for building and processing SAS datasets are typed into the Program editor. A SAS session may involve typing statements like the ones above for library reference, computing new variables, data steps, etc. Entering a long series of statements in such a small space may be awkward, so another arrangement for the windows may be preferable.

Cascading the windows is one option. To cascade the windows, open the **Window** menu, and choose **Cascade** as indicated in the following.

The following option also uses color to distinguish between windows.

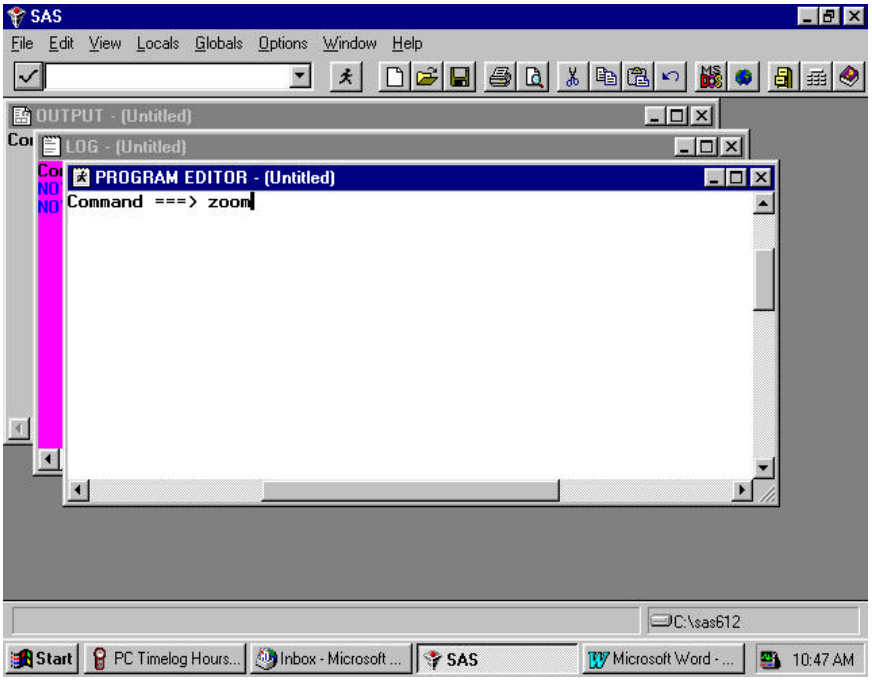


Clicking the option Cascade produces the following result.



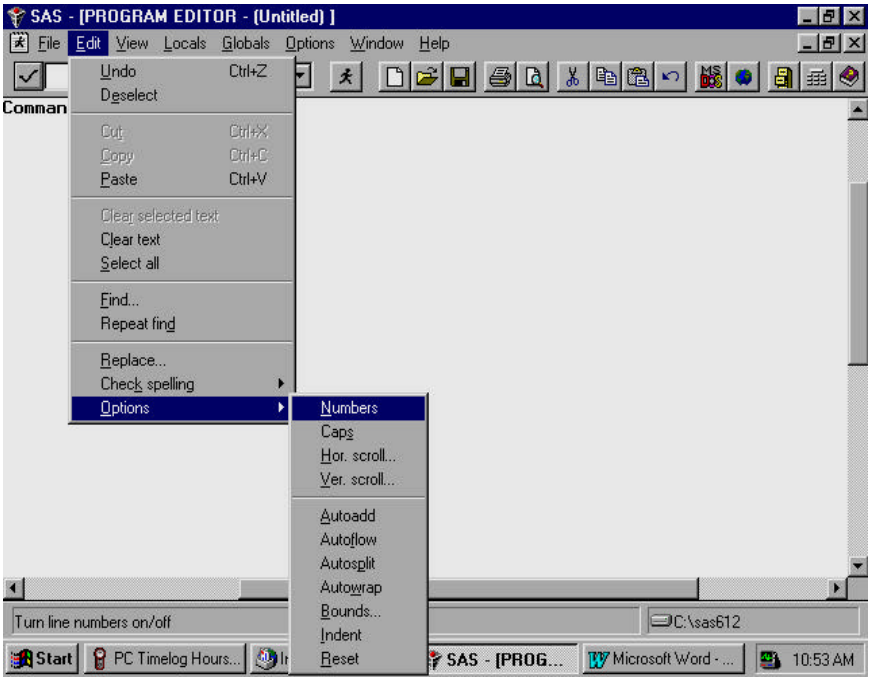
Each window is partly superimposed on the other. The colors distinguish between windows at a glance. With the Program Editor in front, SAS statements may be typed there with relative ease. As a final option,

you can enlarge the Program Editor to fill the entire screen. At the command line, type ***zoom*** as in the following:

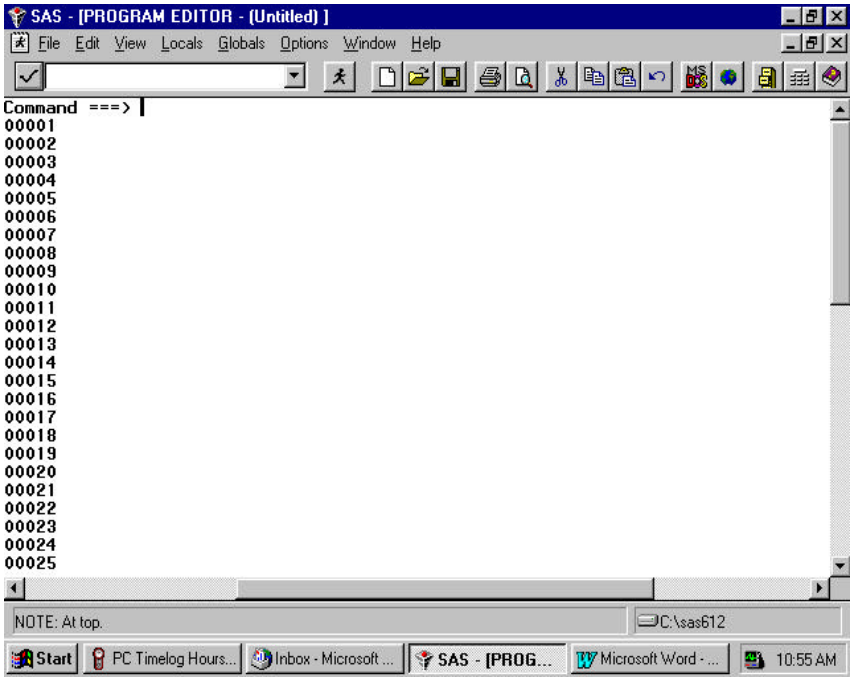


The window changes to fill the screen.

One more option for customizing screens is explained below. This involves adding line numbers to the editing environment in the Program Window. After adding the line numbers, many useful line-editing commands become available (see the SAS Manual). On the **Edit** menu choose **Options** and **Numbers** as in the following screen.



The line numbers appear at the left of the full screen Program Editor as in the screen below, and the SAS statements can be typed into the screen and edited.



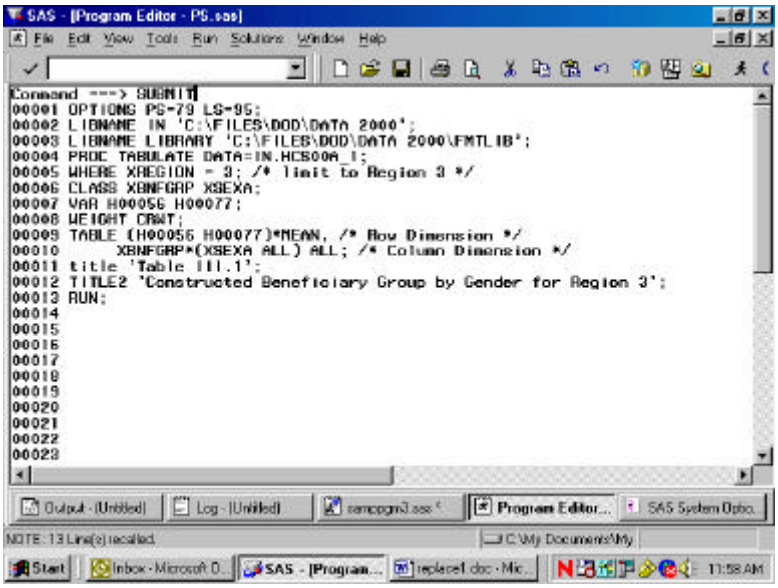
Below is an example of a PROC TABULATE to construct a table of health care variables by beneficiary group by gender for respondents in region 3. Beneficiary group (XBNFGRP) and sex (XSEXA) are both

class variables with a discrete number of values. The columns of the table are beneficiary group broken out by sex, a total for each beneficiary group, and a region total. The health care variables (H00056 and H00077) are the analysis variables appearing as the rows of the table. The statistic that we want to see is the weighted mean of these variables for each group in the table and for the entire region as a whole.

Enter the following SAS statements into the **Program Editor**.

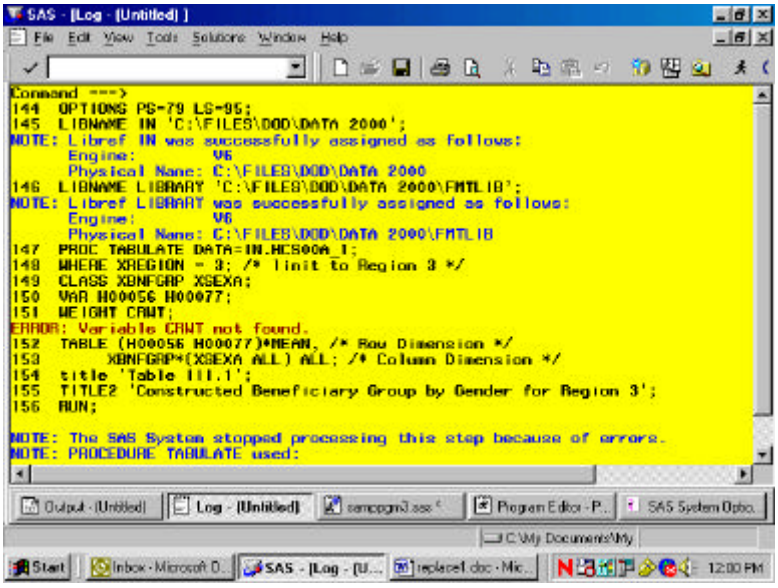
```
OPTIONS PS=79 LS=95;
LIBNAME IN 'C:\FILES\DoD\DATA2000';
LIBNAME LIBRARY 'C:\FILES\DoD\DATA2000\FMTLIB';
PROC TABULATE DATA=IN.HCS00A_1;
WHERE XREGION = 3;   /* limit to Region 3  */
CLASS XBNFGRP XSEXA;
VAR H00056 H00077;
WEIGHT CRWT;
TABLE (H00056 H00077)*MEAN,    /* Row Dimension */
        XBNFGRP*(XSEXA ALL)  ALL;    /* Column Dimension */
TITLE "Table III-1";
TITLE2' Constructed Beneficiary Group by Gender for Region 3';
RUN;
```

Key **Home** and type the command **SUBMIT** on the Command Line. **Submit** instructs the SAS system to process the commands written in the Program Editor. Your screen should resemble the following.



Enter the Submit command, and the SAS statements disappear from the Program Editor. If a table is successfully produced, the Output window will open and the table will be displayed. If no output is produced, then SAS has encountered an error. SAS statements about the error can be seen and evaluated in the Log window. In all cases, the Log window should be carefully examined after SAS statements are processed. SAS may produce a table even if there are errors in the program, so the table may not be correct.

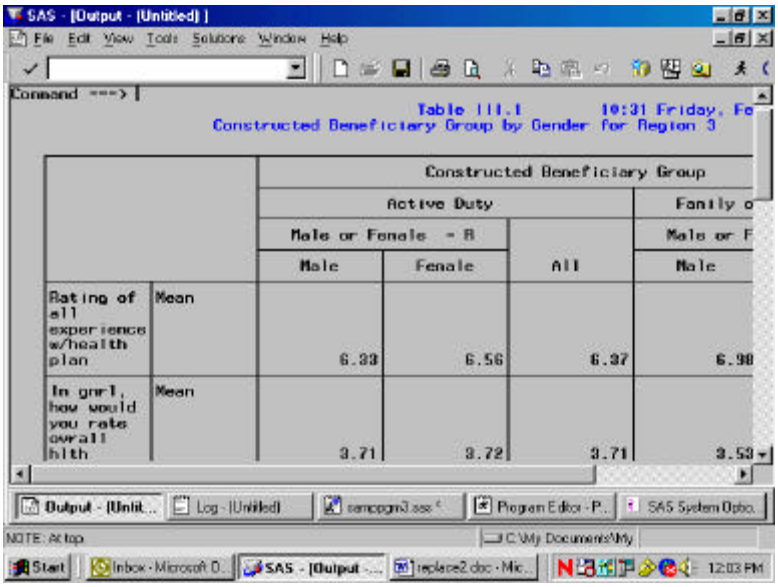
No table was produced for this run. The error is indicated in the Log Window as shown below.



The variable *CRWT* was not found in the dataset. Type **Pgm** on the Command line to return to the Program Editor. Type **Recall** on the Command line and the program statements will reappear in the window.

You can correct the error by entering the CWRWT, the correct variable name, in the weight statement. Then, rerunning the procedure.

The corrected program produces the following output.



The result of this process is Table III.1.

Note that the TITLE statement defines the heading for each page. Titles of more than one line are entered as TITLE, TITLE2, etc.

Using Formats

The format library is the key to interpreting values of discrete variables. For example, in the program above, the format library found at C:\FILES\DoD\DATA2000\FMTLIB indicates that a Value of 1 for XSEXA means male, and a value of 2 for XSEXA means female. Similarly, if XBNFGRP equals 1, the respondent is active duty; if XBNFGRP equals 2, the respondent is a family member of active duty personnel; if XBNFGRP equals 3, the respondent is an under-65 retiree or a survivor or one of their family members; if XBNFGRP equals 4, the respondent is a 65-or-over retiree, survivor, or one of their family members.

Since formats are associated with the variables in the HCSDB, formatting is automatic as long as SAS can locate the format library. Error messages will result if the LIBNAME LIBRARY statement is not present. If the format library is not available for some reason, use the statement

FORMAT _ALL_;

within the PROC TABULATE to prevent SAS from searching for the missing format library. The default formats in the format library were used to produce the table described in the previous section.

Table Appearance

Format modifiers and temporary labels improve the appearance of a table. In Table III.1, the values of the statistics are of the form x.xx. If each cell is defined to be six positions wide with two positions to the right of the decimal, there is adequate space plus some extra room to keep the table from looking crowded. This is done by crossing the statistic with the format modifier:

MEAN*F=6.2

Labels are attached to all variables in the HCSDB. You can use temporary labels to override the label within the SAS dataset. It is not always necessary to use both the variable label and the formatted values for each value of a class variable. In the previous example, the formatted values of XBNFGRP are active duty, family members of active duty, etc. which we know to be beneficiary groups; the title also tells you that these are beneficiary groups. The table can be made attractive by deleting the heading for XBNFGRP by including a blank for the temporary label:

XBNFGRP=' '

Similarly, because the statistic being reported here is a mean, you do not need MEAN on each row. You can add or eliminate a label and include a format modifier to the same variable:

MEAN=' '*F=6.2

The headings for XSEXA and ALL can be improved:

XSEXA='Gender'
ALL='Group Total' for the ALL that is crossed with XBNFGRP
ALL='Total' for the Region 3 total

Table III.1
Constructed Beneficiary Group by Gender for Region 3

		Constructed Beneficiary Group				
		Active Duty			Family of Active	
		Male or Female - R			Male or Female - R	
		Male	Female	ALL	Male	Female
Rating of all experience w/health plan	MEAN	6.33	6.56	6.37	6.98	6.75
In gnrl, how would you rate ovrall hlth	MEAN	3.71	3.72	3.71	3.53	3.57

(CONTINUED)

Table III.1
Constructed Beneficiary Group by Gender for Region 3

		Constructed Beneficiary Group					
			Ret/Surv/Fam 65+				
		Ret/Surv/Fam <65					
		Family of Active	Male or Female - R			Male or Female - R	
		ALL	Male	Female	ALL	Male	
Rating of all experience w/health plan	MEAN	6.77	7.28	7.39	7.34	8.00	
In gnrl, how would you rate ovrall hlth	MEAN	3.57	3.36	3.33	3.35	3.12	

(CONTINUED)

Table III.1
Constructed Beneficiary Group by Gender for Region 3

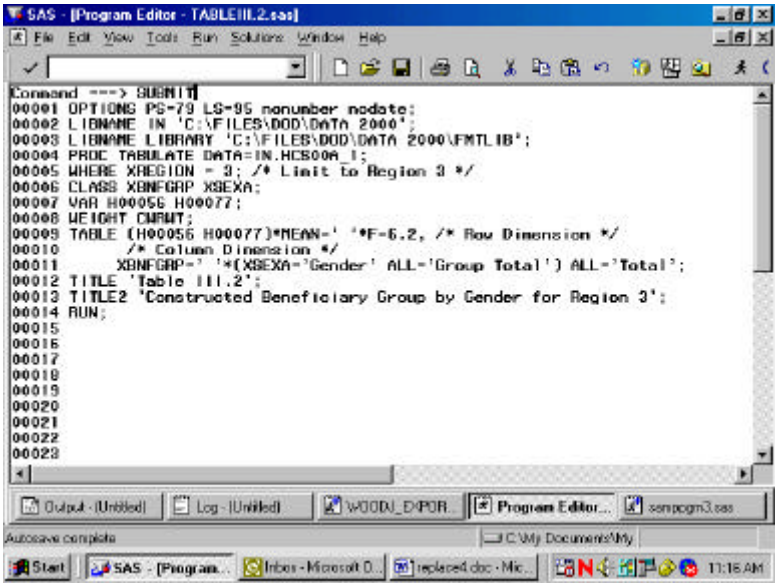
		Constructed Beneficiary Group		
		Ret/Surv/Fam 65+		
		Male or Female - R		
		Female	ALL	ALL
Rating of all experience w/health plan	MEAN	8.54	8.25	7.34
In gnrl, how would you rate ovrall hlth	MEAN	3.05	3.09	3.37

The new program looks like this:

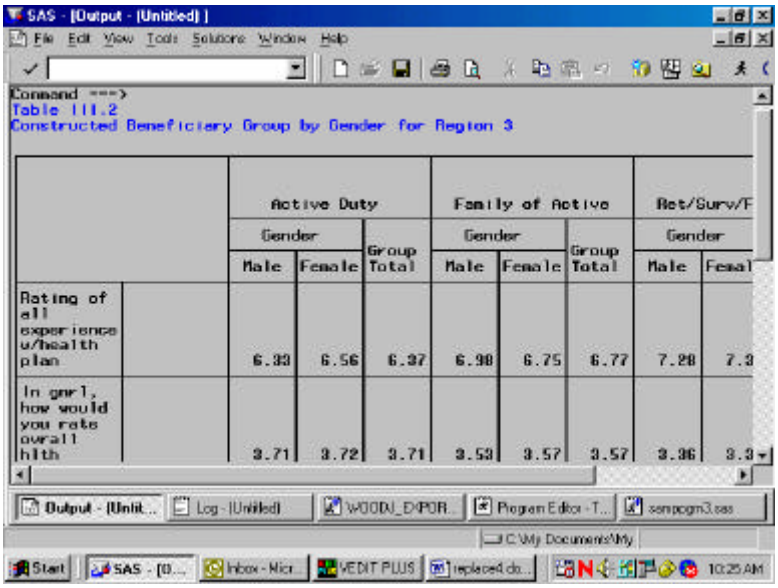
```
OPTIONS PS=79 LS=95;
LIBNAME IN 'C:\FILES\DoD\DATA2000';
LIBNAME LIBRARY 'C:\FILES\DoD\DATA2000\FMTLIB';
PROC TABULATE DATA=IN.HCS00A_1;
WHERE XREGION = 3;   /* limit to Region 3  */
CLASS XBNFGRP XSEXA;
VAR H00056 H00077;
WEIGHT CWRWT;
TABLE (H00056 H00077)*MEAN=' '*F=6.2,    /* Row Dimension */
            /* Column Dimension */
            XBNFGRP=' '*(XSEXA='Gender' ALL='Group Total')
            ALL='Total';

TITLE "Table III.2";
TITLE2 'Constructed Beneficiary Group by Gender for Region 3';
RUN;
```

Typing these statements into the Program Window produces the following screen.



After the **Submit** command is entered, the following table is displayed in the Output window.



The resulting output is in Table III.2.

Table III.2
Constructed Beneficiary Group by Gender for Region 3

	Active Duty			Family of Active			Ret/Surv/Fam <65		
	Gender		Group	Gender		Group	Gender		Group
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Rating of all experien-ce w/health plan	6.33	6.56	6.37	6.98	6.75	6.77	7.28	7.39	7.34
In gnrl, how would you rate ovrall hlth	3.71	3.72	3.71	3.53	3.57	3.57	3.36	3.33	3.35

(CONTINUED)

Table III.2
Constructed Beneficiary Group by Gender for Region 3

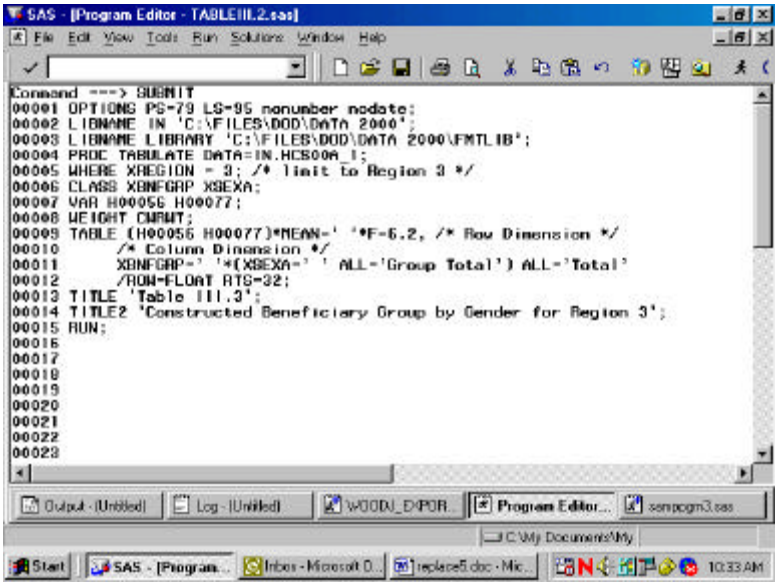
	Ret/Surv/Fam 65+			
	Gender		Group	
	Male	Female	Total	Total
Rating of all experien-ce w/health plan	8.00	8.54	8.25	7.34
In gnrl, how would you rate ovrall hlth	3.12	3.05	3.09	3.37

Although the label for MEAN is deleted, there is still a space in the table for this label. You can eliminate this blank space by using the TABLE option of ROW=FLOAT. SAS row headings are automatically allocated; you can override this by using the TABLE option of RTS=n where n is an integer value specifying the number of print positions to be used for row headings. If you decide that we don't need the label 'Gender' for XSEXA because 'male' and 'female' are self-explanatory, the revised program is as follows:

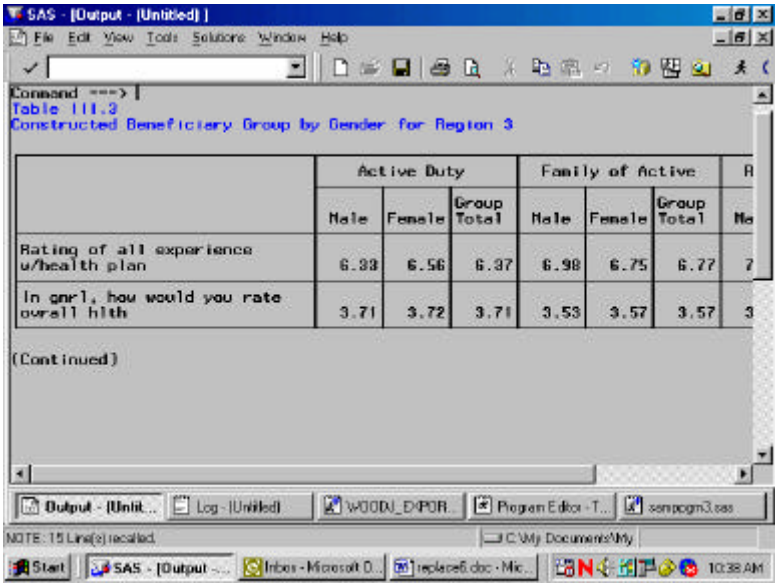
```
OPTIONS PS=79 LS=95;
LIBNAME IN 'C:\FILES\DoD\DATA2000';
LIBNAME LIBRARY 'C:\FILES\DoD\DATA2000\FMTLIB';
PROC TABULATE DATA=IN.HCS00A_1;
WHERE XREGION = 3;   /* limit to Region 3  */
CLASS XBNFGRP XSEXA;
VAR H00056 H00077;
WEIGHT CWRWT;
TABLE (H00056 H00077)*MEAN=' '*F=6.2,    /* Row Dimension */
/* Column Dimension */
XBNFGRP=' '*(XSEXA=' ' ALL='Group Total')
ALL='Total' / ROW=FLOAT   RTS=32;
Title "Table III.3";

TITLE2' Constructed Beneficiary Group by Gender for Region 3';
RUN;
```

Typed into the Program Window, the revised program appears as follows.



The output table is displayed in the Output Window as follows.



The result is Table III.3.

Table III.3
Constructed Beneficiary Group by Gender for Region 3

	Active Duty			Family of Active			Ret/Surv/Fam <65	
	Male	Female	Group Total	Male	Female	Group Total	Male	Female
Rating of all experience w/health plan	6.33	6.56	6.37	6.98	6.75	6.77	7.28	7.39
In gnrl, how would you rate ovrall hlth	3.71	3.72	3.71	3.53	3.57	3.57	3.36	3.33

(CONTINUED)

Table III.3
Constructed Beneficiary Group by Gender for Region 3

	Ret/Surv/Fam <65	Ret/Surv/Fam 65+			
	Group Total	Male	Female	Group Total	Total
Rating of all experience w/health plan	7.34	8.00	8.54	8.25	7.34
In gnrl, how would you rate ovrall hlth	3.35	3.12	3.05	3.09	3.37

Calculating Percents

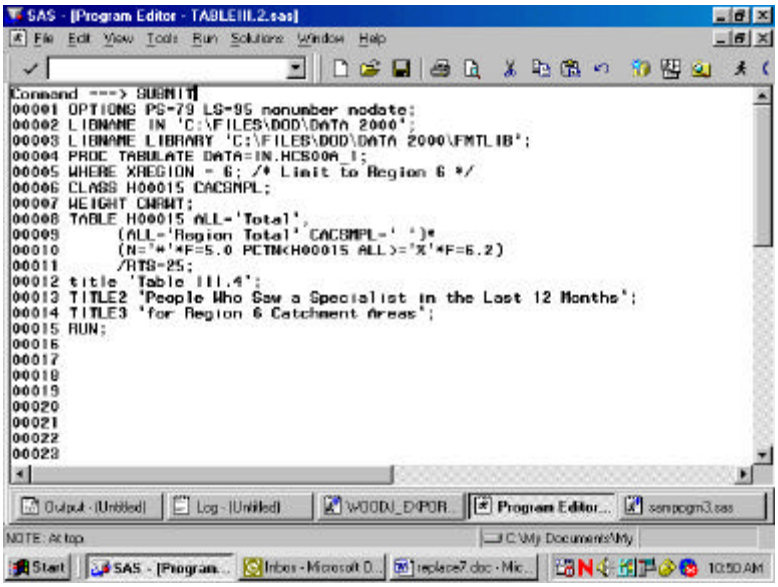
When calculating percentages, it is necessary to appropriately define the denominator. To calculate a column percentage, the denominator definition must include all *class* variables that define the *row*. For example, if you want to look at the percentage of people in your region and each of the catchment areas who answered yes (or no) to question 15, 'In the last 12 months, did you see a specialist?', your TABLE statement in the TABULATE procedure would look like this:

WHERE XREGION = 6;

TABLE H00015 ALL='Total',

(All='Region Total' CACSMPL)*PCTN<H00015 ALL>='Percent';

Table III.4 includes a program and its output for calculating column percentages. The program statements in the Program Editor appear as follows.



The submitted statements produce the following output.

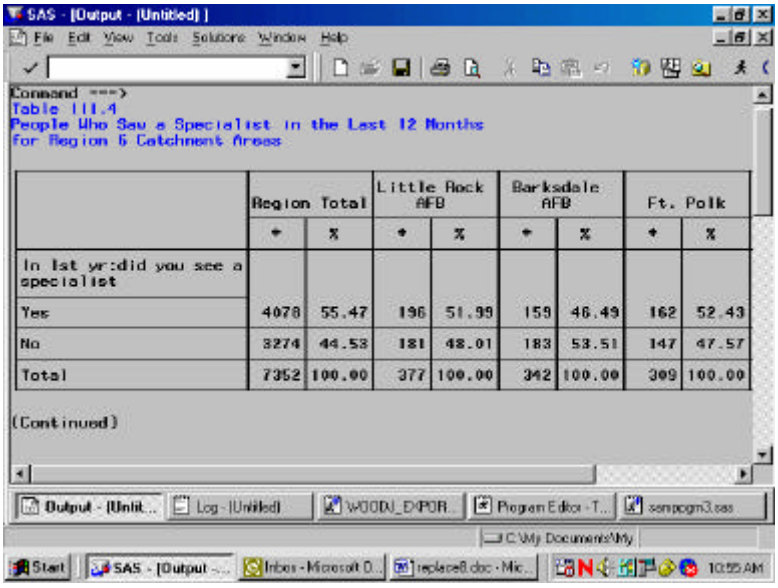


Table III.4
People Who Saw a Specialist in the Last 12 Months
for Region 6 Catchment Areas

	Region Total		Little Rock AFB		Barksdale AFB		Ft. Polk		Tinker AFB	
	#	%	#	%	#	%	#	%	#	%
In lst yr:did you see a specialist										
Yes	4078	55.47	196	51.99	159	46.49	162	52.43	182	45.96
No	3274	44.53	181	48.01	183	53.51	147	47.57	214	54.04
Total	7352	100.00	377	100.00	342	100.00	309	100.00	396	100.00

(CONTINUED)

Table III.4
People Who Saw a Specialist in the Last 12 Months
for Region 6 Catchment Areas

	Ft. Sill		Brooke AMC-Ft. Sam Houston		Ft. Hood		Dyess AFB		Laughlin AFB/Sheppard AFB	
	#	%	#	%	#	%	#	%	#	%
In lst yr:did you see a specialist										
Yes	261	50.68	707	64.04	337	46.42	166	47.43	228	54.03
No	254	49.32	397	35.96	389	53.58	184	52.57	194	45.97
Total	515	100.00	1104	100.00	726	100.00	350	100.00	422	100.00

(CONTINUED)

Table III.4
People Who Saw a Specialist in the Last 12 Months
for Region 6 Catchment Areas

			NH Corpus			Out/Area	Reg 6	
	Lackland AFB		Christi		Randolph AFB			
	#	%	#	%	#	%	#	%
In lst yr:did you see a specialist								
Yes	474	62.20	202	56.74	211	54.52	793	59.34
No	288	37.80	154	43.26	176	45.48	513	39.28
Total	762	100.00	356	100.00	387	100.00	1306	100.00

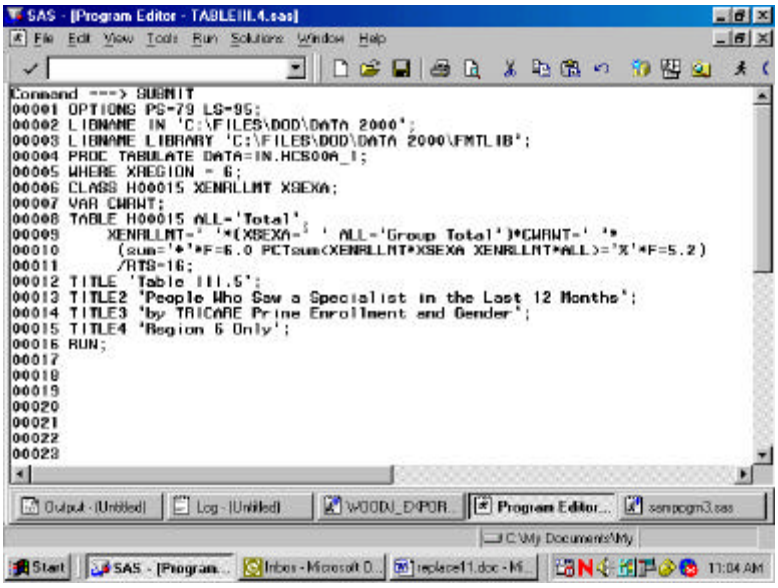
The statistic N is included with PCTN to make it easier to verify that the denominator definitions have been set up properly. After you check to see that the percentages are accurate, the N statistic can be removed. Note that the output for Table III.4 is unweighted. The N statistic (and PCTN statistic) is always unweighted even if a WEIGHT statement is included.

Similarly, if you want to look at the percentage of TRICARE enrollees (and non-enrollees) by gender who answered yes to question 15, this would be a row percentage. To calculate a row percentage, the denominator definition must include all *class* variables that define the c*olumn*. Your TABLE statement would look like this:

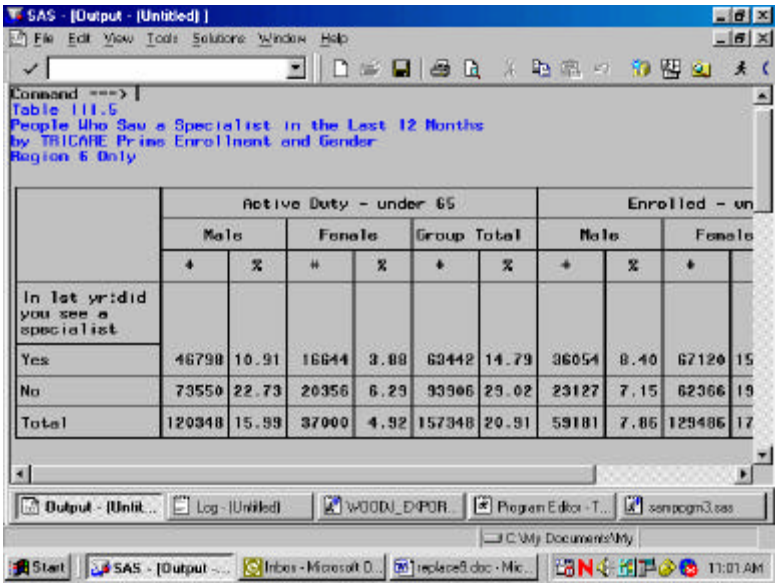
```
TABLE H00015 ALL='Total',
XENRLLMT *(XSEXA=' ' All='Group Total')*
PCTN<XENRLLMT*XSEXA XENRLLMT*ALL>='Percent';
```

Notice that there are no parentheses used in the denominator definition. Because parenthetical groupings are not allowed in the denominator definition, all crossings and concatenations must be included. As noted above, the N and PCTN statistic are unweighted counts of CLASS variables. If you want to produce a weighted count and percentage for this table, you would include CWRWT (the 2000 weight variable) as an analysis variable in the VAR statement and in the column crossing of the TABLE statement; the statistics to be generated should be specified as SUM and PCTSUM. A program and output to demonstrate weighted row percentages appears in Table III.5.

The following screen shows the new program typed into the Program Editor.



These commands produce the following output.



Here, as above, the SUM statistic is included to help determine the accuracy of the denominator definition.

Additional information about running SAS is available from the SAS Institute. Please consult the appropriate manuals for more detailed information.

See Table III.5 to view the entire table.

Table III.5
People Who Saw a Specialist in the Last 12 Months
by TRICARE Prime Enrollment and Gender
Region 6 Only

	Active Duty - under 65				Enrolled - under 65				
	Male		Female		Group Total	Male		Female		Group Total
	#	%	#	%	#	#	%	#	%	#
In lst yr:did you see a specialist										
Yes	46798	10.91	16644	3.88	63442	14.79	36054	8.40	67120	15.64	103174
No	73550	22.73	20356	6.29	93906	29.02	23127	7.15	32366	19.27	85493
Total	120348	15.99	37000	4.92	157348	20.91	59181	7.86	129486	17.20	188667

(CONTINUED)

Table III.5
People Who Saw a Specialist in the Last 12 Months
by TRICARE Prime Enrollment and Gender
Region 6 Only

	Enrolled under 65	Not enrolled - under 65					Not enrolled - 65 or over				
	Group Total	Male		Female		Group Total	Male		Female		
	%	#	%	#	%	#	%	#	%	#	%
In lst yr:did you see a specialist											
Yes	24.05	52108	12.14	70776	16.50	122885	28.64	68465	15.96	59098	13.77
No	26.42	49423	15.27	45637	14.10	95060	29.38	24338	7.52	21665	6.70
Total	25.07	101531	13.49	116414	15.47	217945	28.96	92803	12.33	80764	10.73

(CONTINUED)

Table III.5
People Who Saw a Specialist in the Last 12 Months
by TRICARE Prime Enrollment and Gender
Region 6 Only

	Not enrolled 65 or over	Enrolled - 65 or over				
	Group Total	Male		Female		Group Total
	#	%	#	%	#	%	#	%
In lst yr:did you see a specialist								
Yes	127563	29.73	7322	7.71	4686	1.09	12008	2.80
No	46004	14.22	1526	0.47	1578	0.49	3104	0.96

```
|--------------+------+-----+------+-----+------+-----+------+-----|
|Total         |173567|23.06|  8847| 1.18|  6264| 0.83| 15112| 2.01|
-------------------------------------------------------------------------
```

How to Make a Table Using SPSS

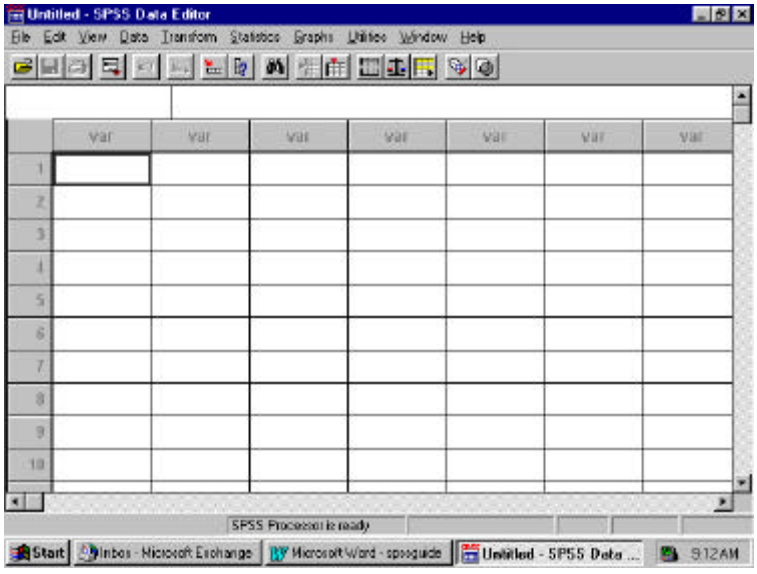
The 2000 Adult HCSDB dataset is in an SPSS format. SPSS is a computer software system used for data management, summarization, and analysis. SPSS can be run interactively, using menus, or in batch mode, using syntax commands. This guide instructs users on how to use SPSS dialog boxes to:

- Construct new variables
- Recode existing variables
- Select cases for analysis
- Weight cases for analysis
- Create customized tables

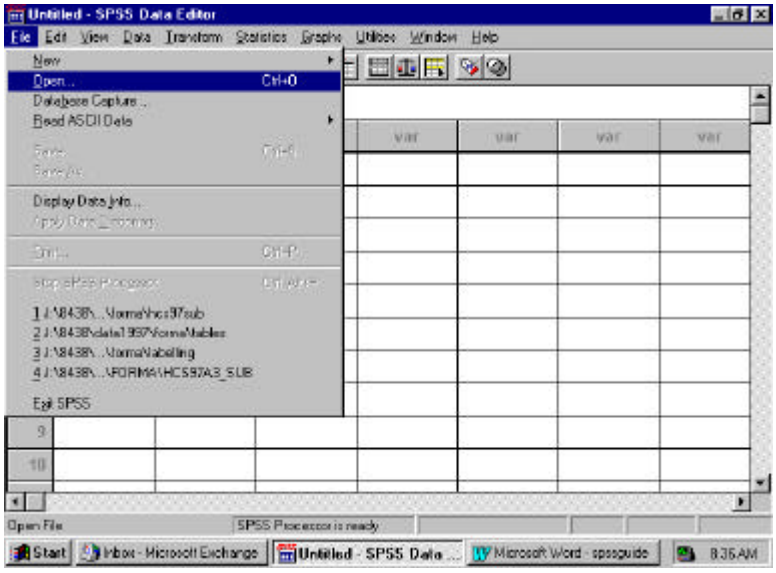
As you use the dialog boxes, you generate syntax automatically. This syntax may be pasted into a syntax file for future use or for modification.

Locating and opening the data file

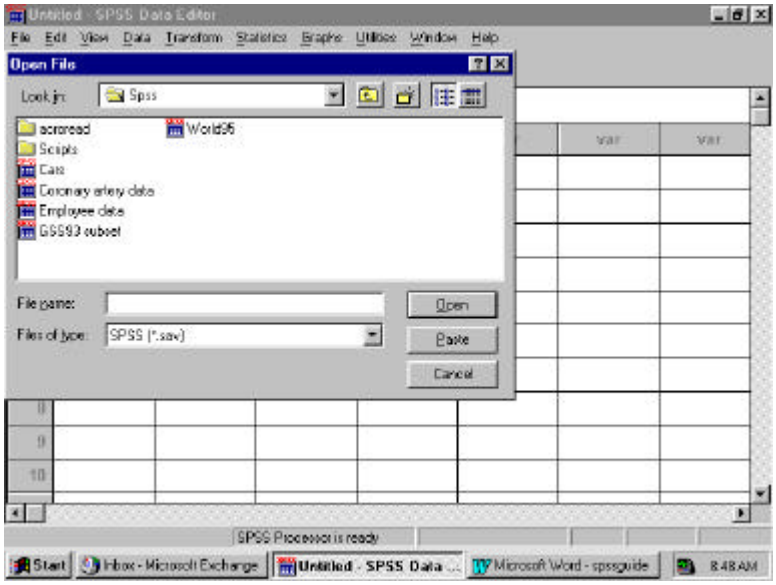
To begin an SPSS session, double click on the SPSS icon on your desktop. The Data Editor window will open and present a blank spreadsheet like the following screen:



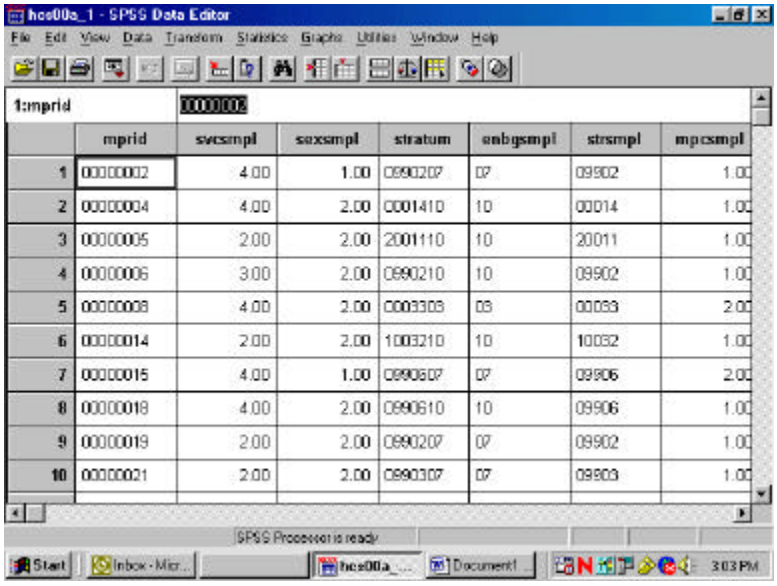
Click on File in the upper left corner to open the following menu:



Select the **Open** option or choose a file from the list displayed. **Open** produces the following screen:



If the file is not in this directory, navigate through your folders until you locate it. Mark the file and click **Open**. You will be returned to the spreadsheet Data Editor with the file on view. The 2000 Adult HCSDB dataset has been opened and is displayed below.



Constructing new variables

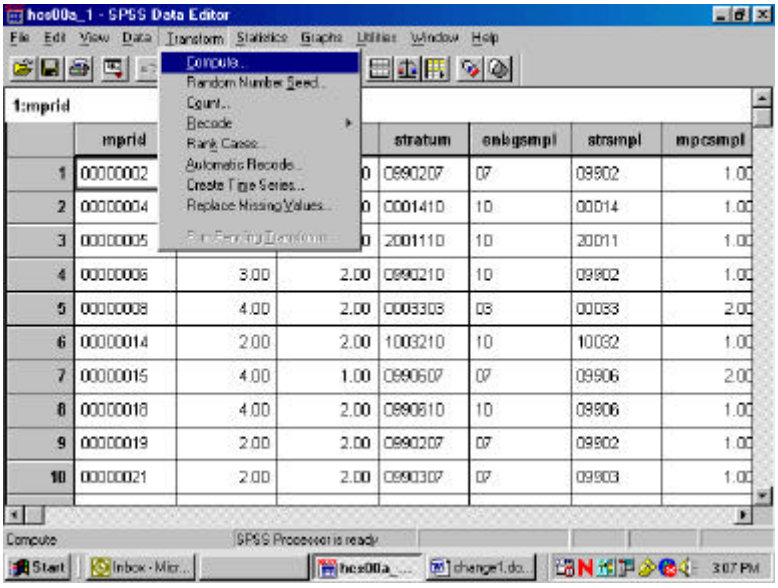
Data can be evaluated from many different aspects. It is sometimes useful to build new variables from combinations of the existing ones and to examine their distributions.

For example, the variable in the file for beneficiary group at the time of sampling is called xbnfgrp, and the variable for sex is xsexa. The value 1 for xbnfgrp indicates that the individual is on active duty. The relationships for constructing a new variable of active duty by sex are:

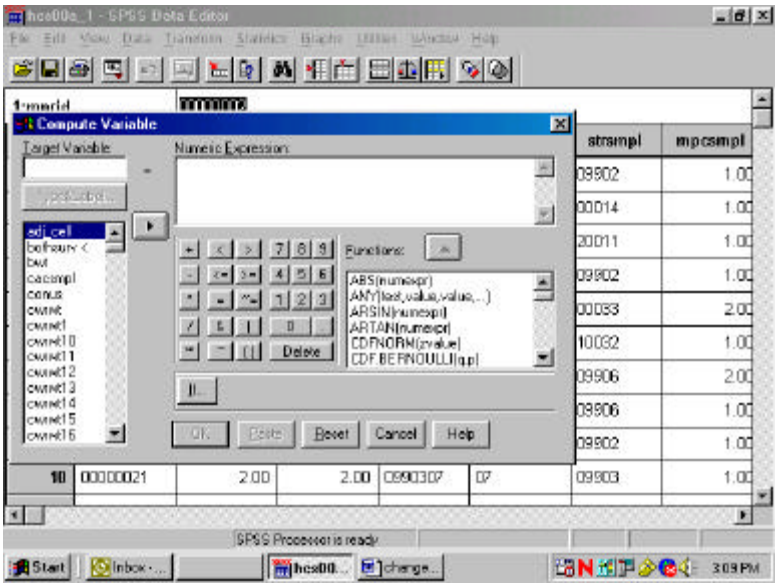
Active-duty-males: ***xsexa=1 and XBNFGRP=1***

Active-duty-females: ***xsexa=2 and XBNFGRP=1***

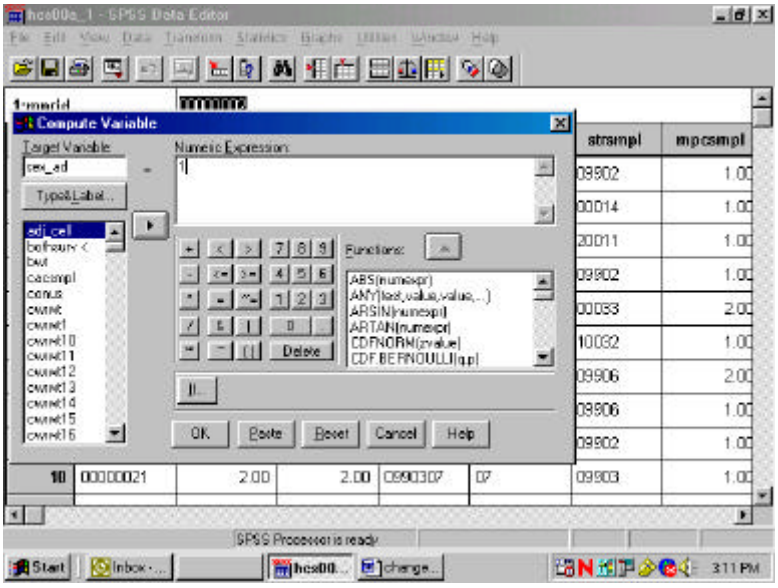
Open the Transform menu and select Compute as in the following:



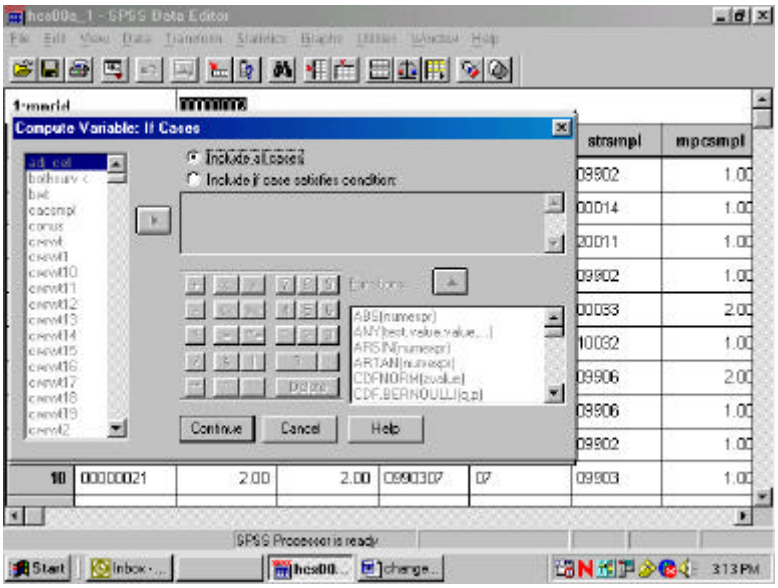
The following dialog box will open:



You can build the new variable in two steps to express the two conditions. The first task is to give the new variable a name and its first value. Enter the Target Variable slot and name the new variable sex_ad. Next, assign the value 1 to sex_ad by entering it into the slot for Numeric Expression. Your screen should look like the following:

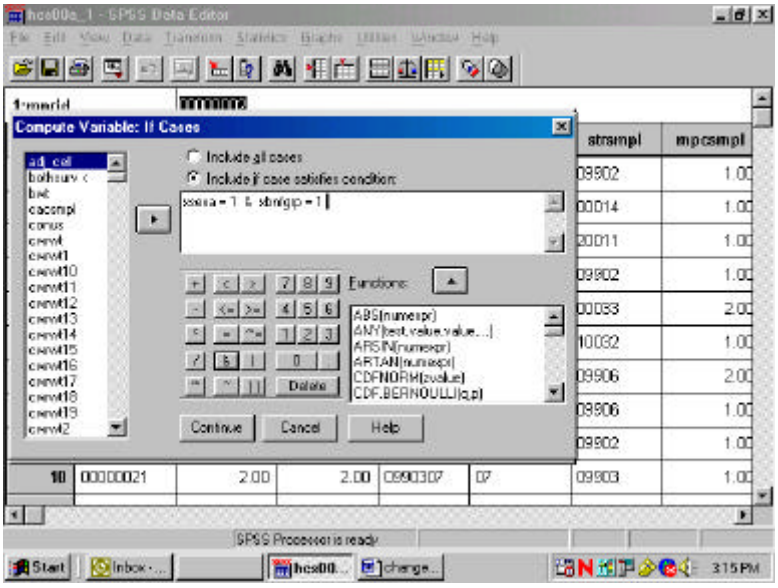


Once you we have assigned the value 1 to sex_ad, you can build the condition that qualifies the assignment. Click on If..and open the following dialog box:

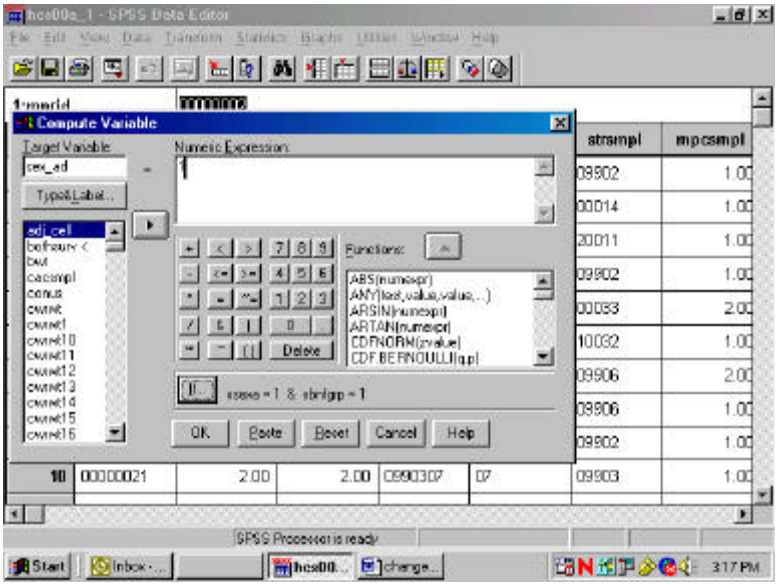


Click on the circle indicating Include if case satisfies condition, and the black dot will move to that circle. The slot underneath will open, ready for your input. Build the "if" condition. Write it directly into the slot or move the elements into the slot from the given options. Add the elements xsexa = 1 & xbnfgrp = 1.

The screen should resemble the following:



Click on Continue and return to the previous screen, which will now look like this:



Your condition will be written next to the If button. Click on OK to exit the dialog box, and the variable sex_ad will be created with its value set to 1.

The next step is to build the second condition for the new variable, which will set it to the value 2. Reopen the Compute dialog box. The commands you just gave still appear in the dialog box. Simply assign the value 2 to sex_ad, press If, and enter 2 for the value of xsexa . Click Continue, and finish with OK. The condition, if xsexa = 2 and xbnfgrp = 1, will be added to the new variable sex_ad.

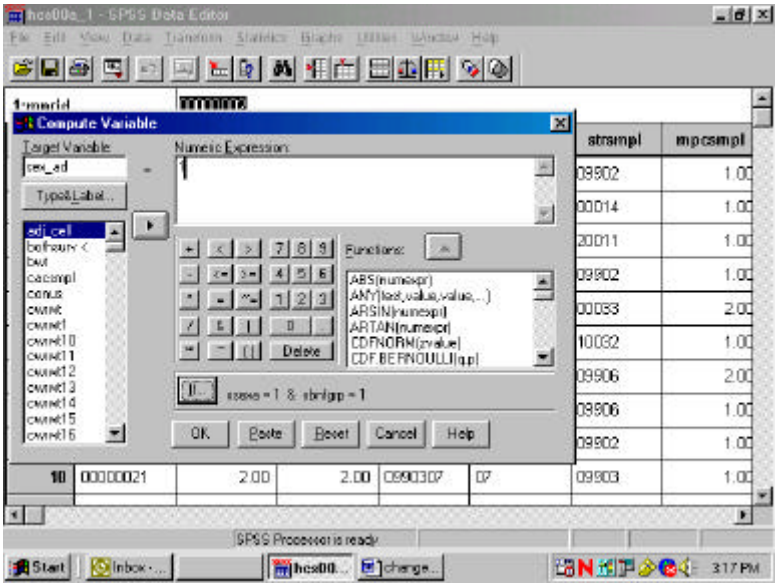
Once you have created a new variable, you may want to add it permanently to the dataset. The new variable is computed for each case in the file and added to the view in the Data Window after the last variable in the dataset. The variable name is the column heading.

Since the HCSDB data set carries Read-Only status to protect it from corruption, changes to it cannot be saved. At the end of the day, when the work session ends and you exit SPSS, the file will revert to its former status and the new variables will be lost. The solution is to save the dataset under a new name when you exit. Choose the Save As option on the File menu, and you will be prompted to name the file and to save it in a folder of your choosing. Give the file a new name and save it. Open the new expanded file anytime for processing.

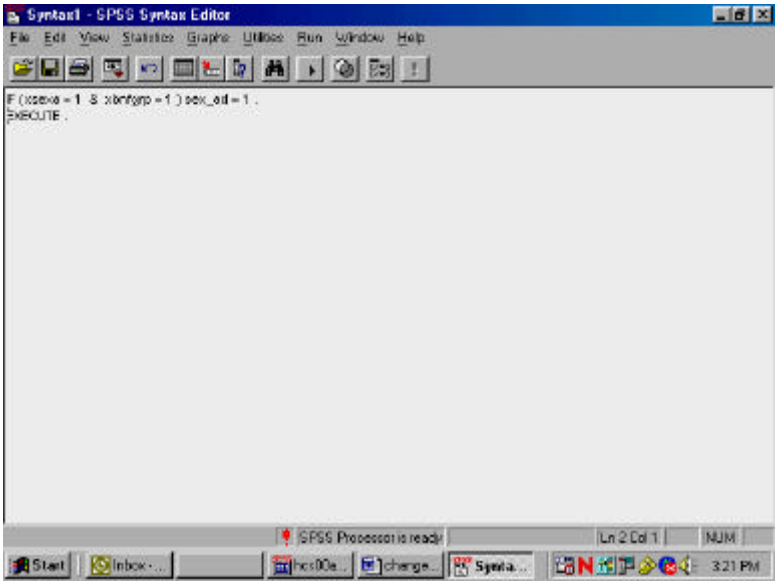
Suppose you do not want to use up your disk space for expanded copies of the dataset. Another option is to save the syntax you have generated in a file that can be run as it is needed. Syntax is a written instruction generated by the commands you give in a dialog box. These "sentences" can be saved in a file and executed when needed. This is the batch mode of processing syntax commands. Syntax files take up very little space.

Experienced SPSS programmers, who have mastered SPSS syntax, often prefer to work only in batch mode. This option is available to users who have not mastered the syntax language. You can paste the commands, generated interactively in the dialog box, onto a syntax file.

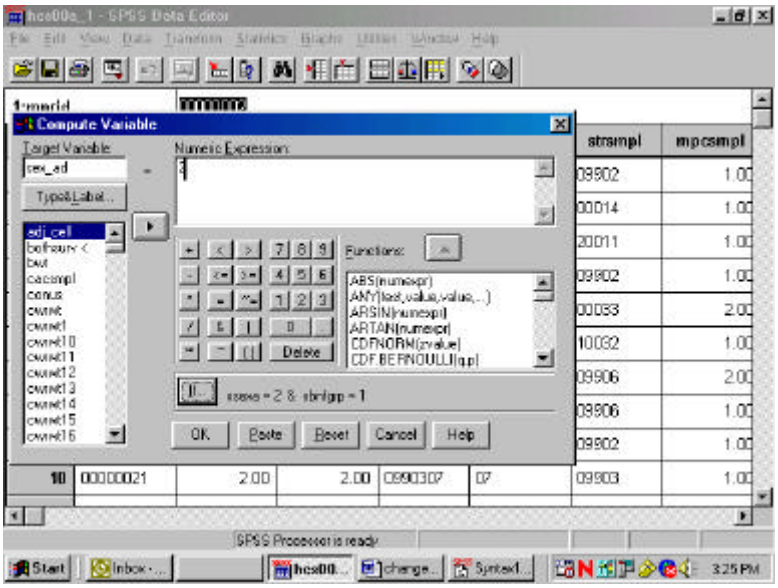
Recall the compute example for the new variable sex_ad. The screen below is the result of assigning 1 to sex_ad according to an If condition. You clicked on OK to set the value. Returning to the screen and clicking on Paste writes the command to a syntax file.



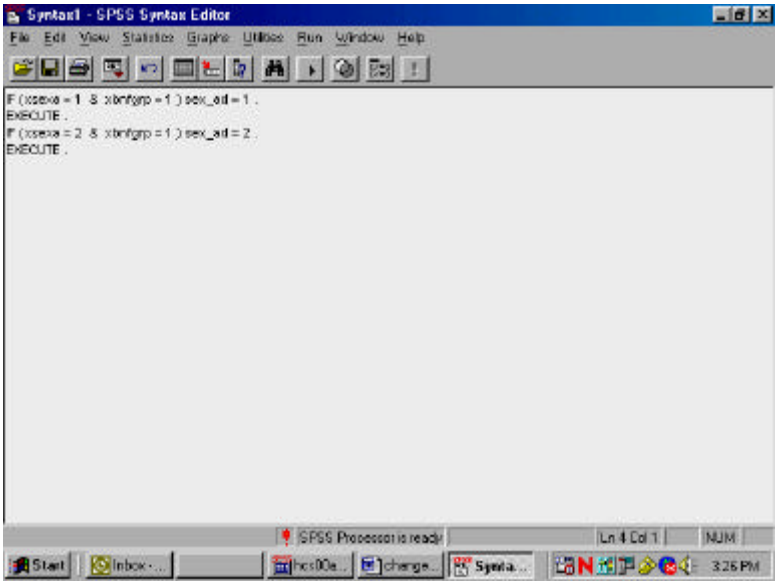
Click on the Paste button, and the syntax window below will open with the syntax written in it.



Now return to the compute dialog box.



Assign the value **2** to **sex_ad** as in the diagram above. Select **Paste,** and these commands will be appended to the syntax file.



The results appear in the screen above. SPSS gives default names to syntax files, such as Syntax1, Syntax2, etc., as they are created. It is a good idea to save the syntax, re-naming the file using the **Save As** option on the **File** menu. Use a name that has some meaning to you, e.g., **New_computes**. The file will automatically receive the suffix .**sps**.

Another option for adding new variables to the dataset is to **Recode** existing variables **into** new variables. A common example involves **grouping** an age variable into age categories as shown below, using the variable **DAGEQY,** which exists on our dataset. **DAGEQY** is coded in years from 18 to 103, which can be grouped into four age categories:

18 to 34 = 1 - label: “young adult”

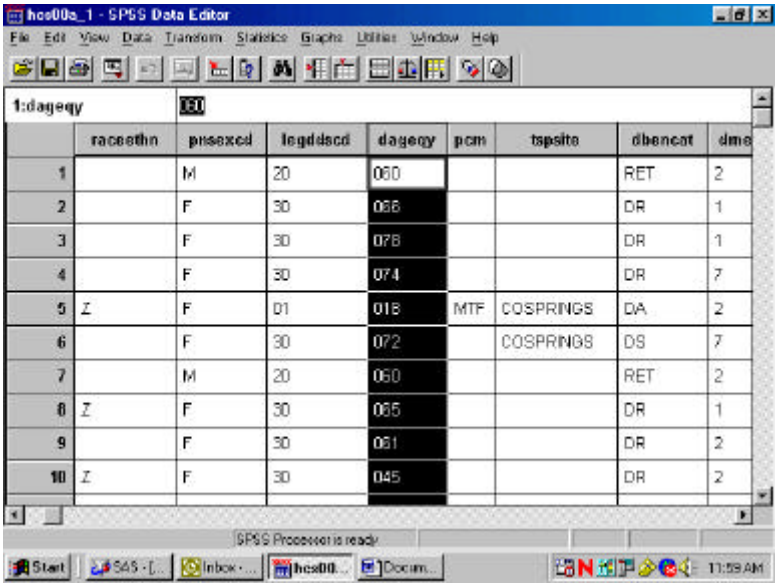
35 to 49 = 2 - label: “mature adult”

50 to 65 = 3 – label: “middle-age”

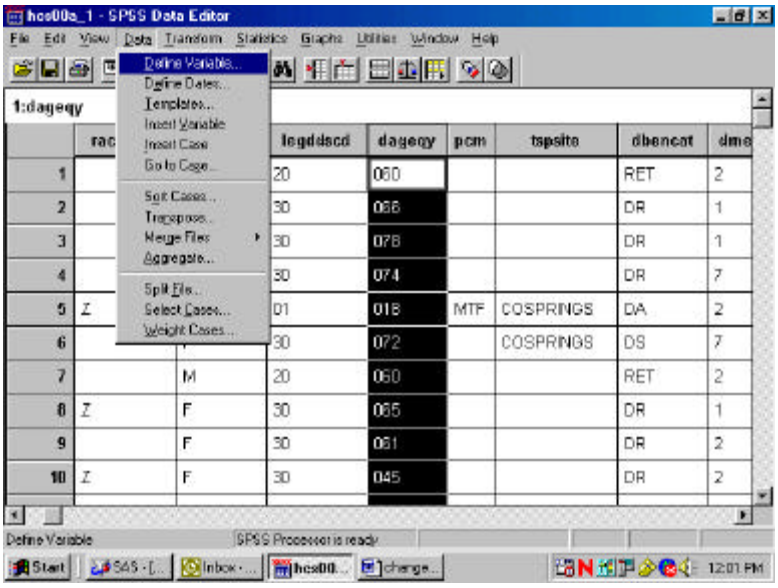
66 to 103 = 4 – label: “senior citizen”

The new variable is called **age_grp.**

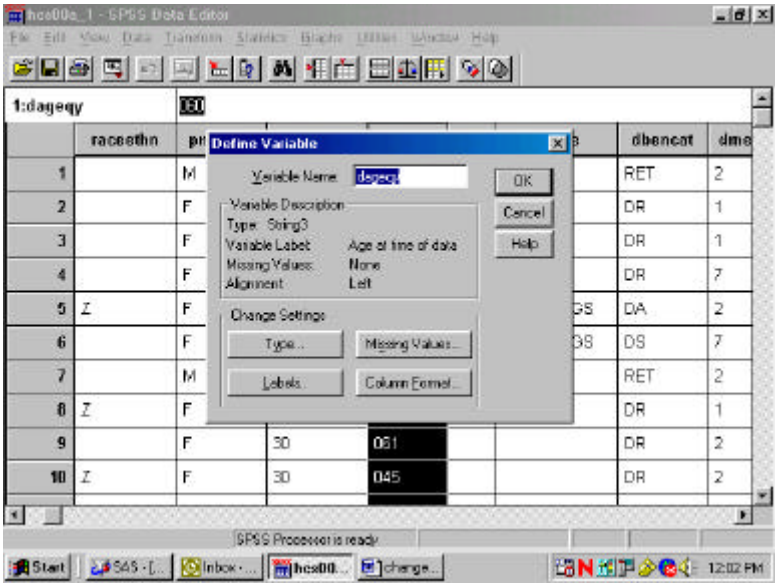
DAGEQY is a string variable. In order for it to be recoded using grouping criteria, it must be converted to a numeric variable. In the data window go to the column for the variable **DAGEQY** and click in the gray area at the top of the column causing the variable to be selected as the following screen indicates.



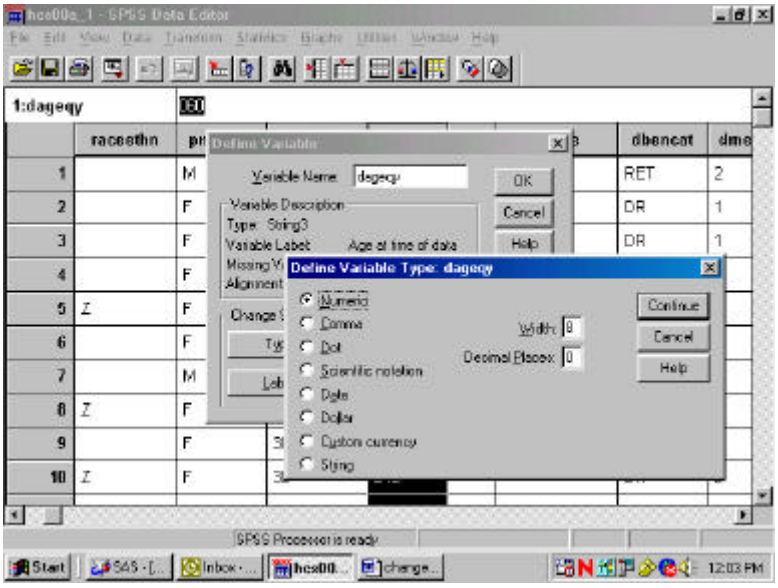
Open the Data menu and select Define Variable as follows:



The following menu will open.

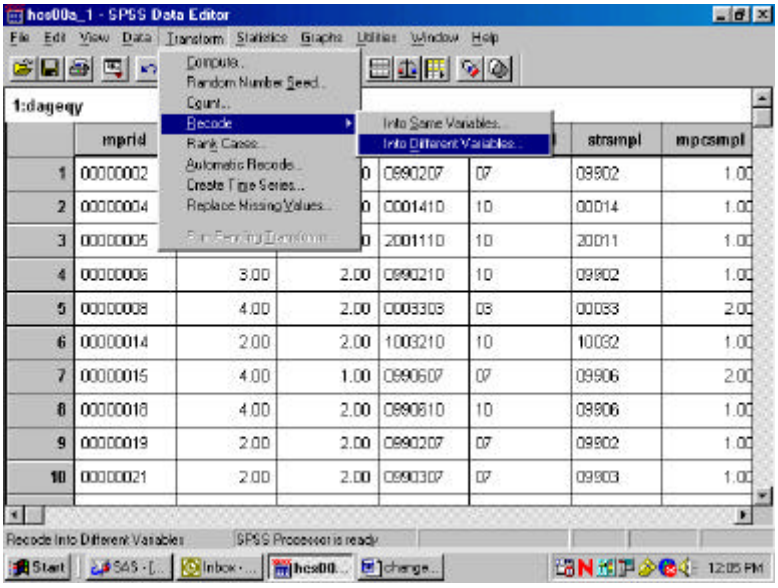


Click on Type and on Numeric, transferring the black dot from String to Numeric as follows:

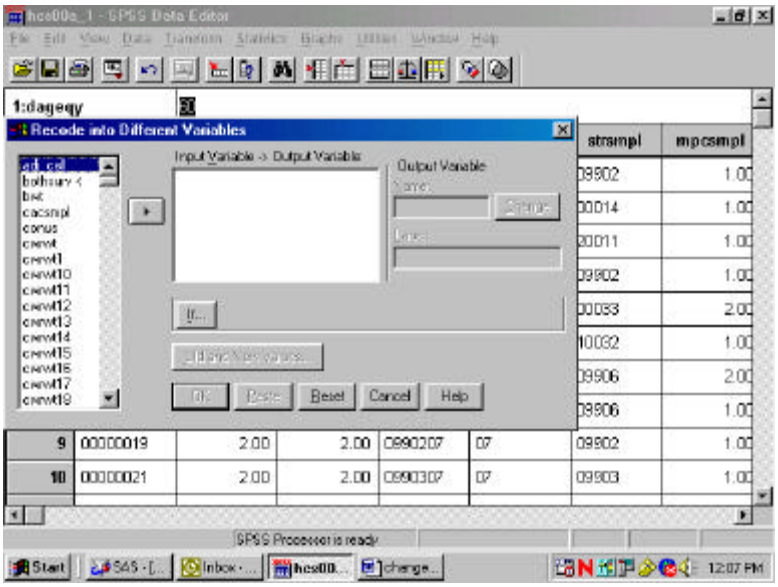


Click on Continue to return to the original screen. Click on OK to set the changes.

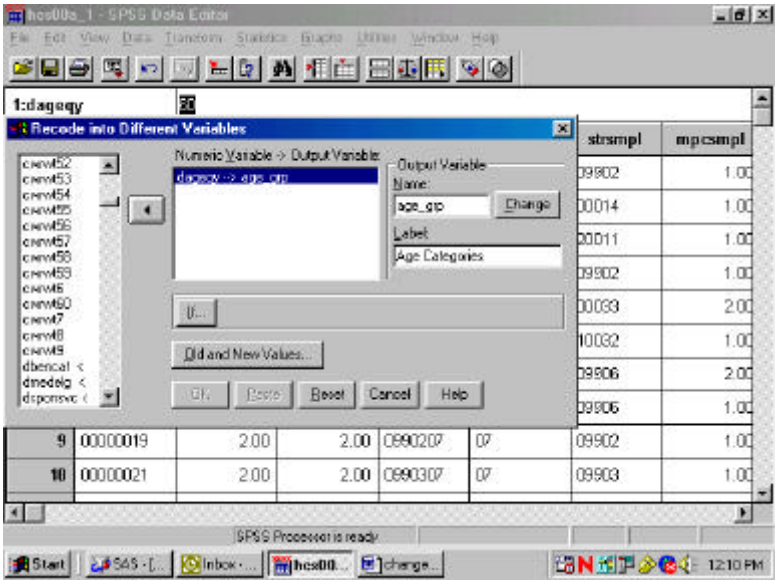
Now from the **Transform** menu, choose **Recode** and **Into Different Variables** as pictured below:



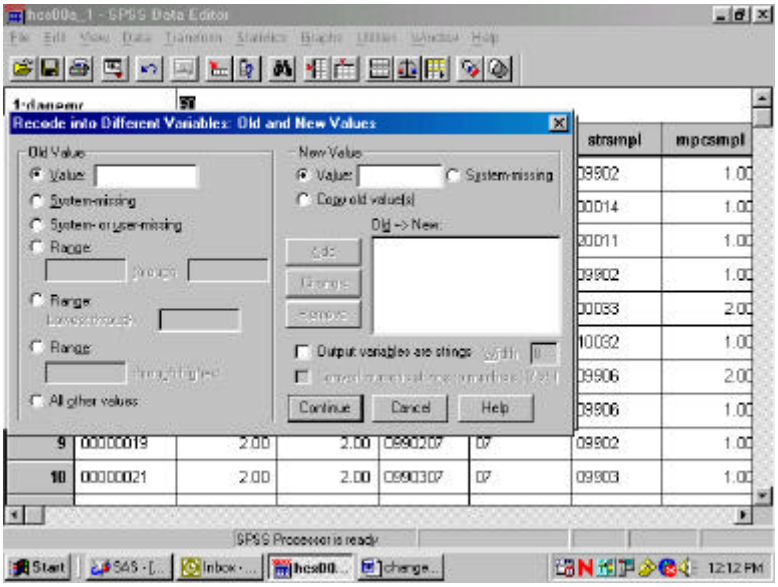
The following dialog box will open:



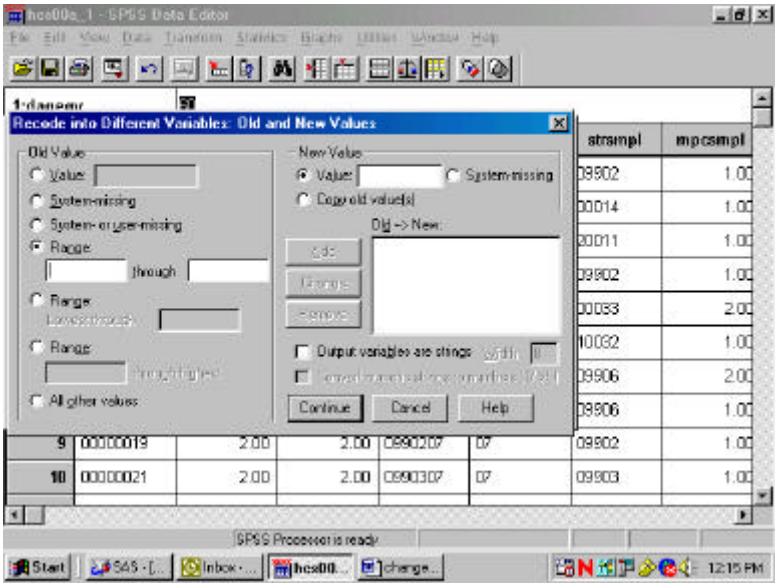
Move **DAGEQY** from the variable list on the left to the box labeled **Input Variable -> Output Variable**. In the **Name** slot, enter the new variable name **age_grp**. Enter **Age Categories**, the variable label, in the **Label** slot. Click on **Change**. The dialog box should look like the one below.



Click on Old and New Values, and the following dialog box will open:

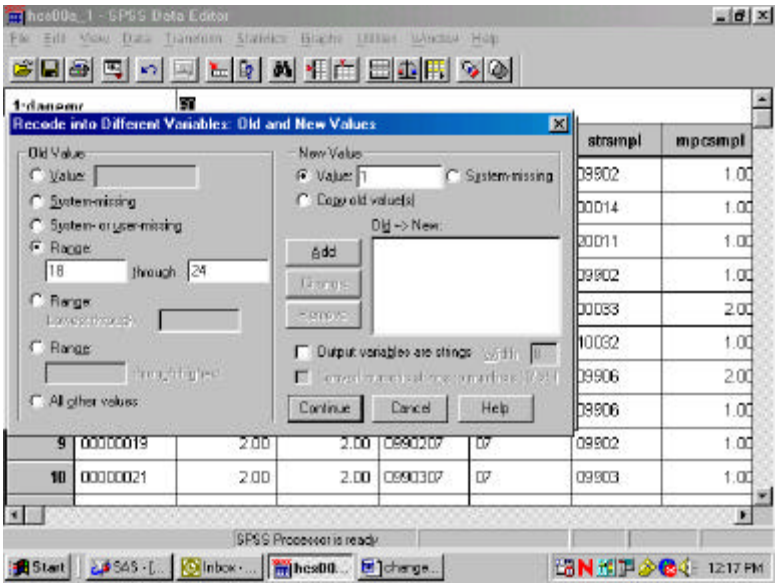


The next step in grouping the age variable is to specify the existing values of **Age** to be recoded. To do this, click on the **Range** circle under **Old Value**.

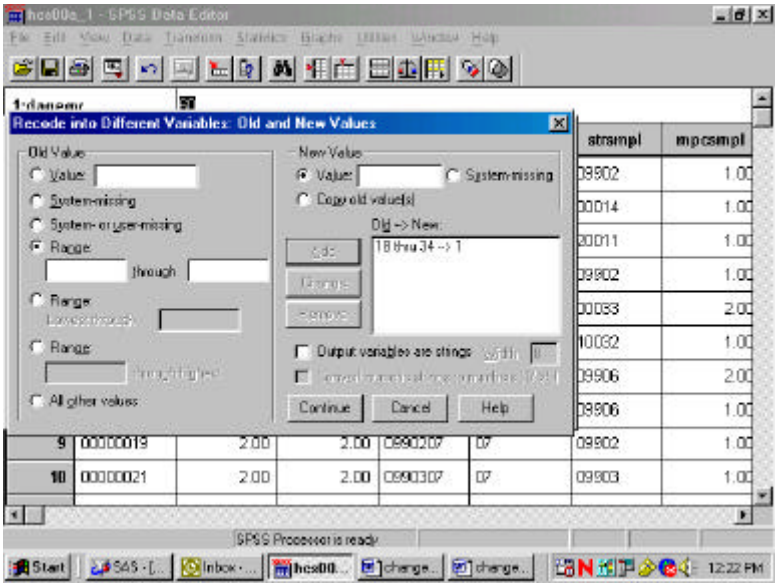


Once the appropriate slots are open, you have four ranges to enter.

First, enter 18 **through** 34 in the slots provided under **Range**. Next, enter the value **1** in the **Value** slot under **New Value**. **Add** is now illuminated.

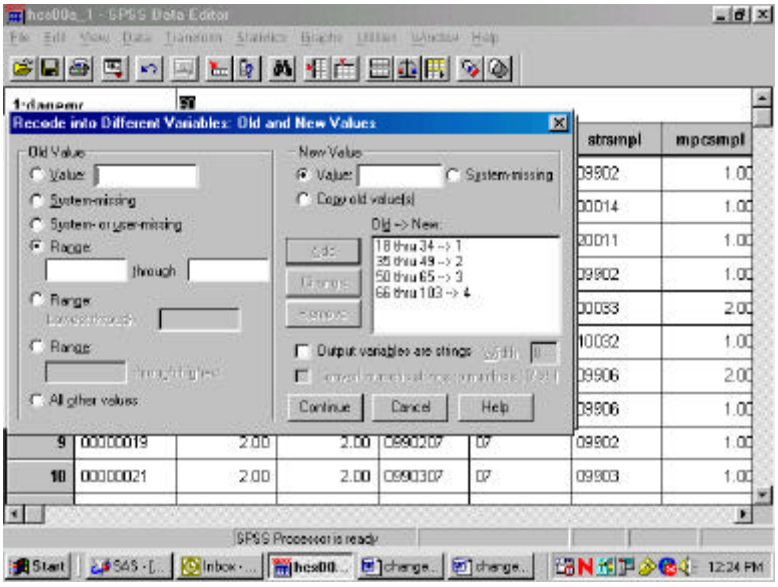


Clicking on Add produces the following result:

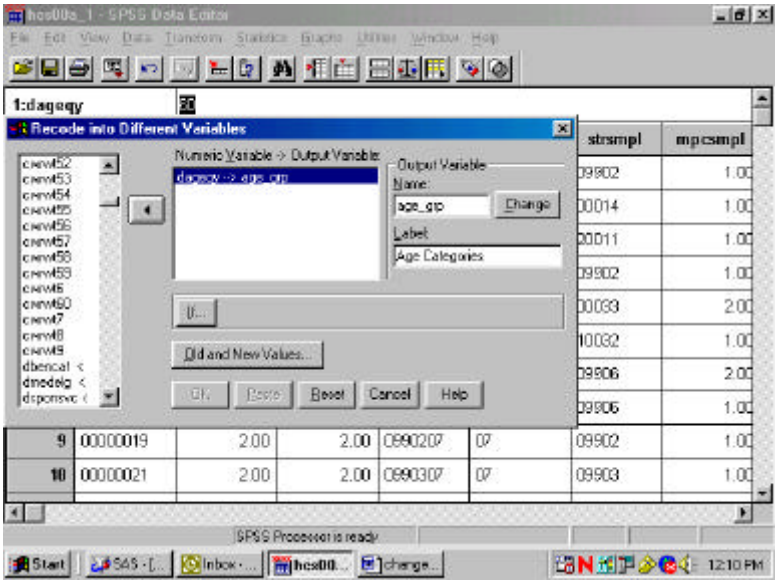


The specified range appears in the box labeled **Old -> New,** and the **Range** and **Value** slots have been cleared to permit additional entries.

The three remaining ranges are built in the same manner, adding each specification, until the dialog box looks like the one below.



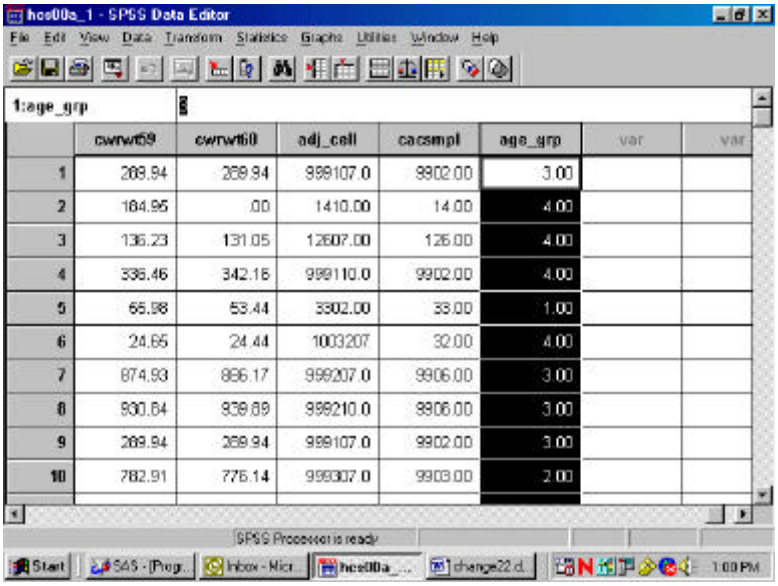
Click on Continue and return to the previous screen.



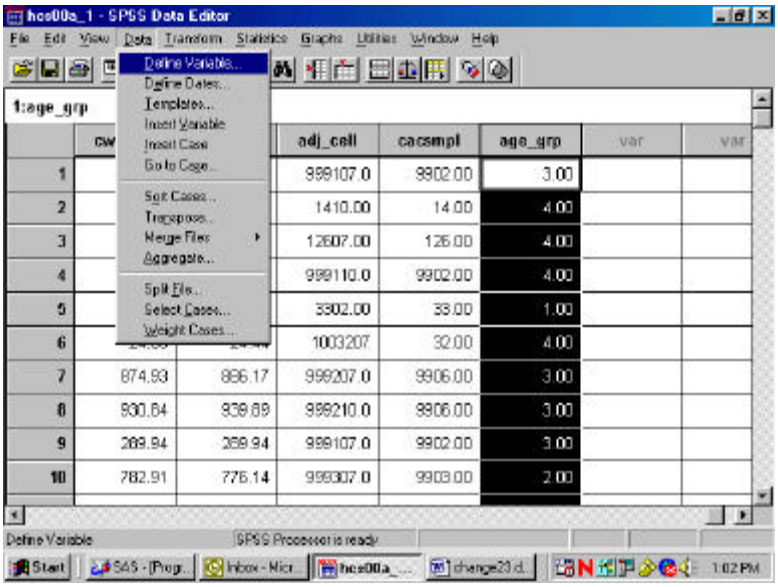
Click on **OK** to exit the screen. The new variable **age_grp** has been created. The **Recode** syntax can be pasted to a syntax file.

The final task is to create the value labels for the new variable **age_grp.** Labeling variables makes output from statistical reporting procedures much clearer and more elegant.

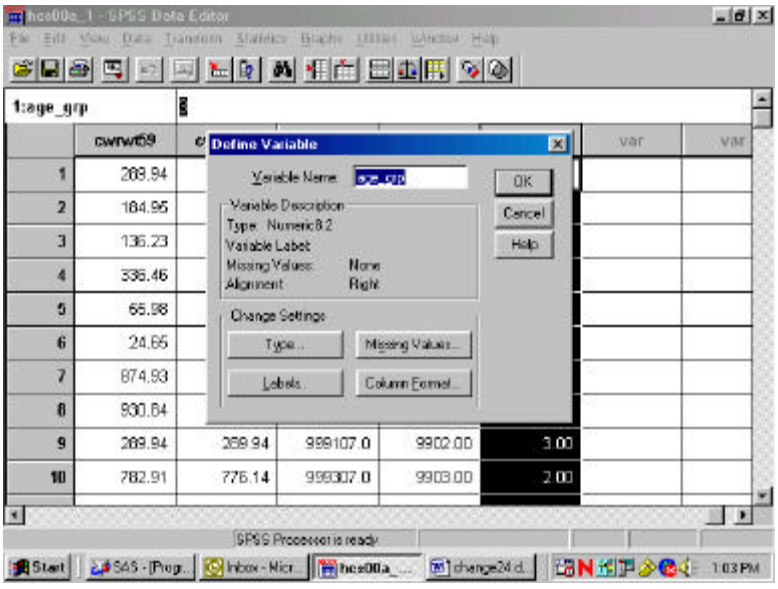
In the **Data Window,** go to the column for the new variable **age_grp** and click in the gray area containing the variable name. The entire column will darken indicating that it has been selected.



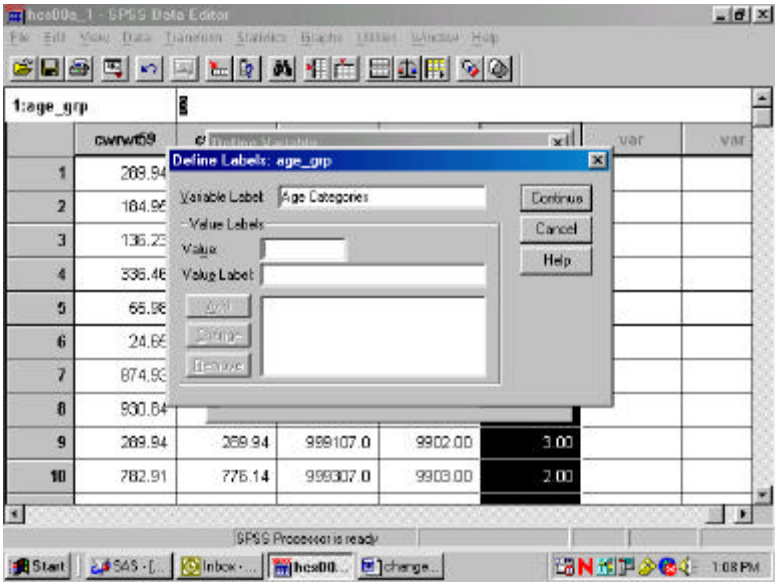
Click on the **Data** menu at the top of the screen to open the following dialog box.



Click on **Define Variable** to get to the following dialog box:

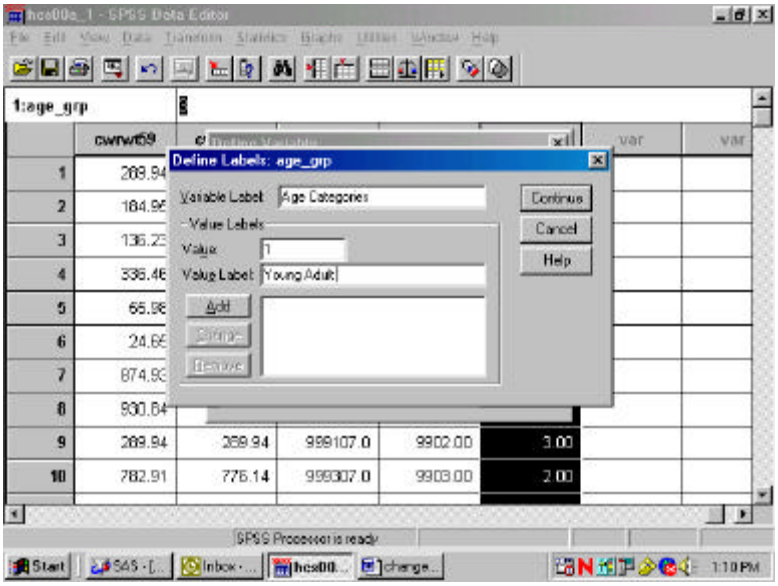


The characteristics of **age_grp** are displayed in this dialog box. Information about the variable type, its label, and its missing values appears here. Click on **Labels** to get to the following screen:

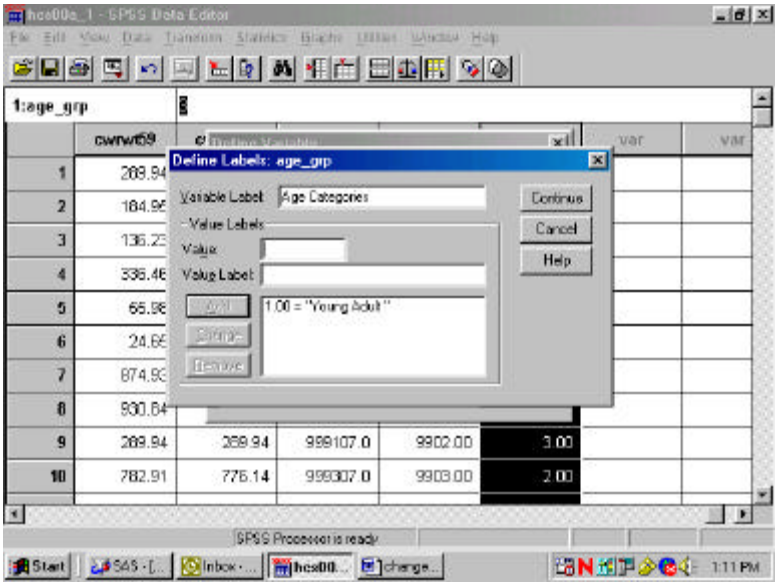


In the slot marked **Variable Label** is the label **Age Categories,** which was specified during the **Recode** process. If there is no label for the variable, enter one in this slot.

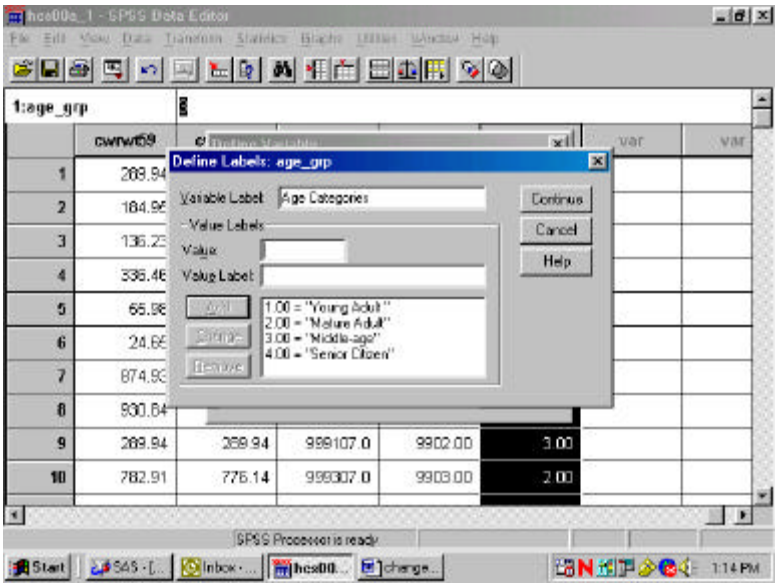
You can then begin to label the *values* of **age_grp**. Enter **1** in the slot marked **Value,** and enter the label **Young Adult** in the slot marked Value Label. The screen will look like the following:



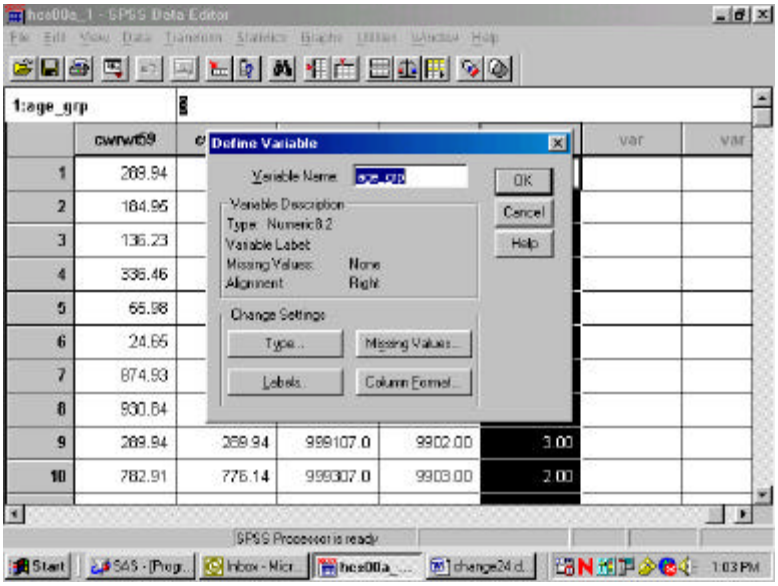
Add is now illuminated. Click on **Add** and the text of your command will appear in the central box, clearing the slots for further entries, as in the next screen.



Build the other three labels until the screen looks like the following:



Click continue, and return to the first screen.



Click on **OK** to exit. The labels have been added.

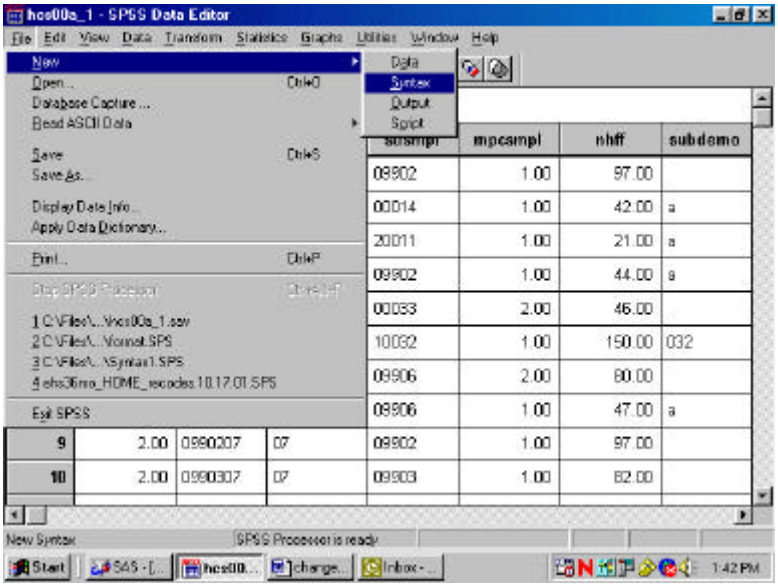
Limiting the Number of Variables

The HCSDB dataset contains many variables. To speed up software performance time, it may be desirable to limit the number of variables for analysis. There are ways to do this.

The first is to **Save** a subset of variables in a new file with a new name. This option is available only through syntax. The **Keep** or **Drop** command lets you save a subset of variables. The choice of **Keep** or **Drop** is dependent on which list is shorter to write.

For example, suppose you want to run some procedures to evaluate the rating of all experiences with the health plan as it relates to the beneficiaries' state of health. You are also interested in the differences between military and civilian services, and in differences within these groupings by gender. Moreover, you want to look at regional differences and differences among catchment areas. You can do all the work on a subset of only nine variables, saving them in a separate file.

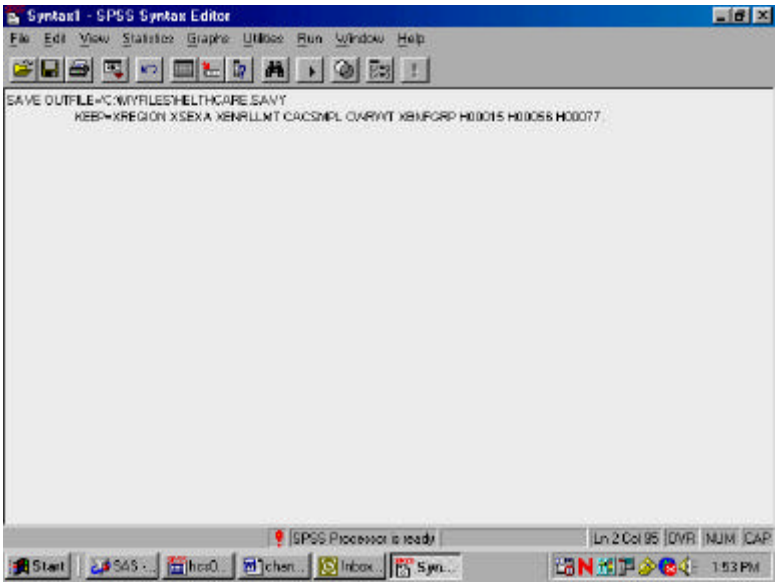
To write the syntax, open a syntax window. If you want to create a new syntax file, choose **New**, **Syntax** on the **File** menu as in the following:



A blank syntax window will open.

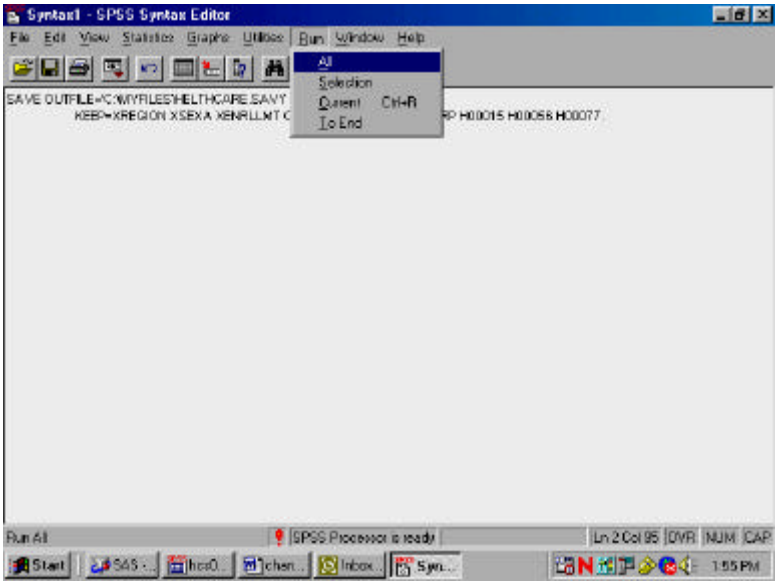
Write the following command, substituting the file name and directory specification:

SAVE OUTFILE='C:\MYFILES\HELTHCARE.SAV'/KEEP=XREGION XSEXA XENRLLMT CACSMPL CWRWT XBNFGRP H00015 H00056 H00077. as in the following:



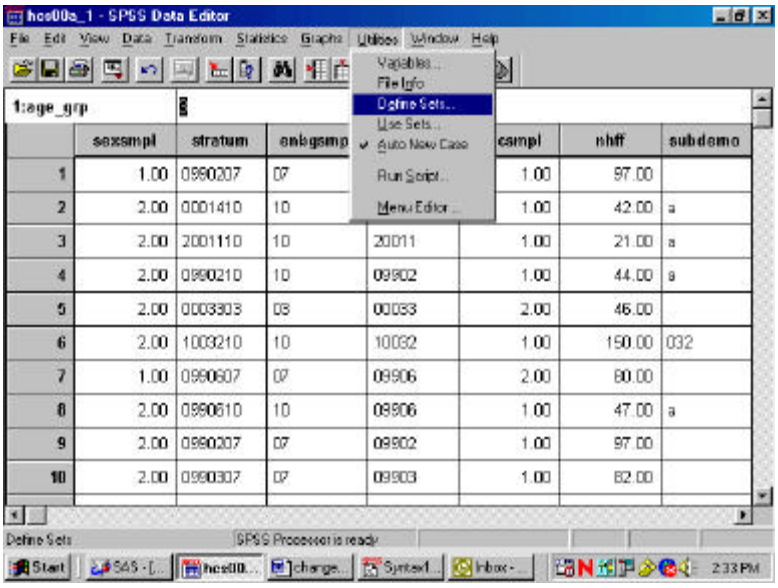
Upper case is optional. Be sure to enclose the entire file name in single quotes and to type a period at the end of the command.

Run the command by choosing the **Run** menu and selecting **All** from the choices.

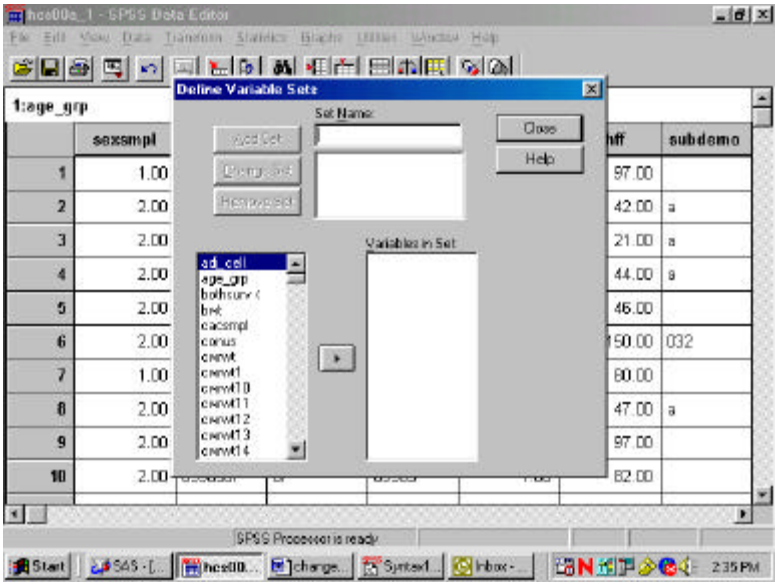


Open the new file according to the specifications at the beginning of this chapter.

The second way to limit the number of variables for analysis is to define a subset of *variables* that will appear in the dialog boxes for procedures. Using the **Utility** menu, define a subset of variables as in the following:

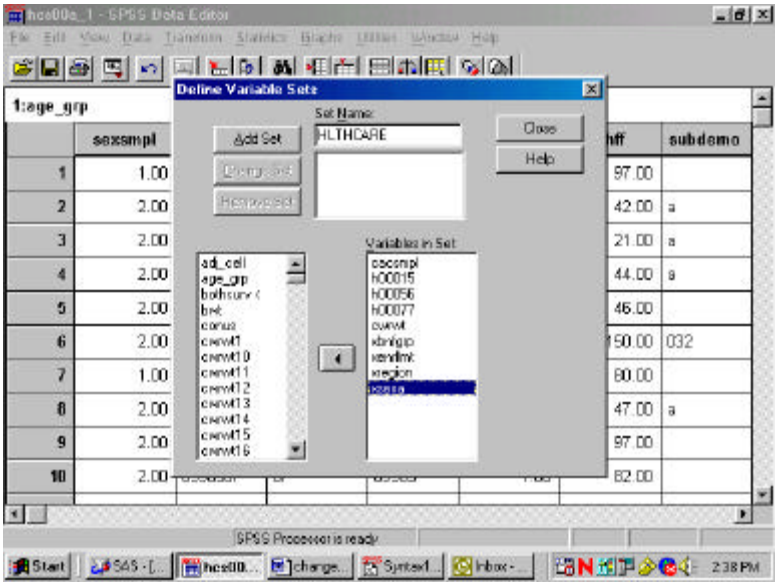


Select Define Sets.

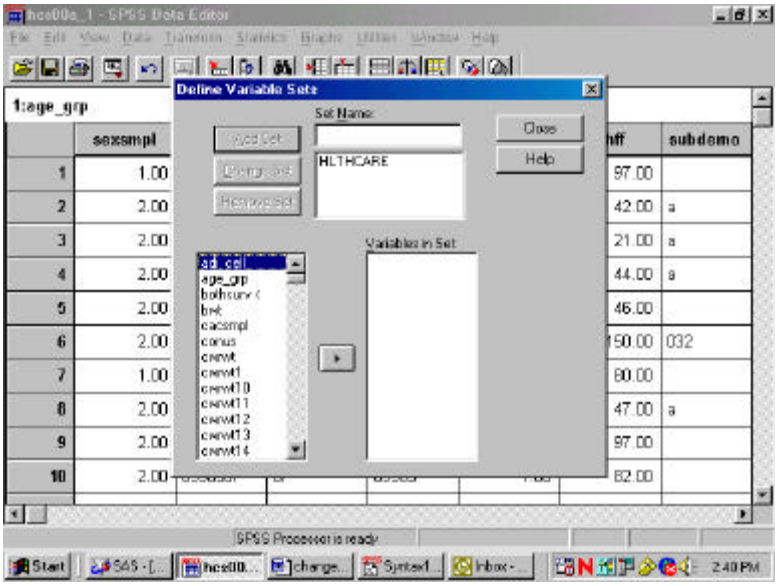


Insert a name for the subset of variables in the slot labeled **Set Name**. Move the variables you want to subset from the list on the left to the slot marked **Variables in Set**. By way of illustration, we will move the nine variables selected for the day's processing.

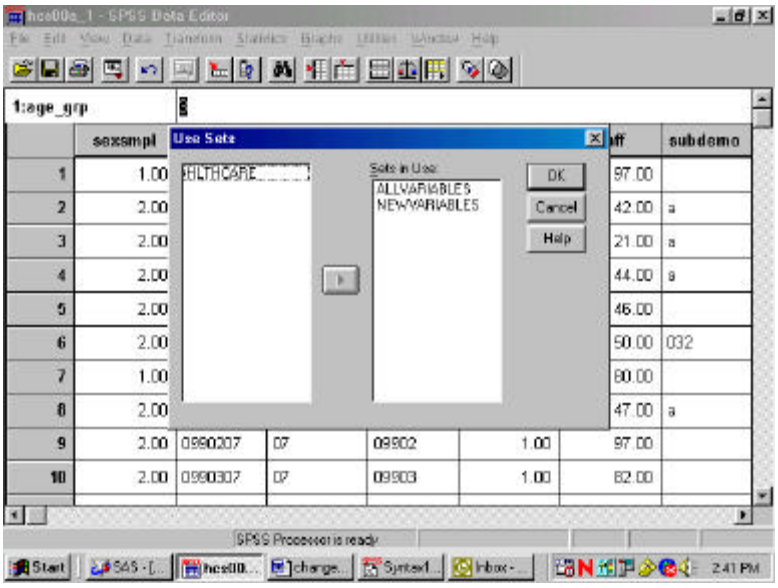
The screen should look like the following:



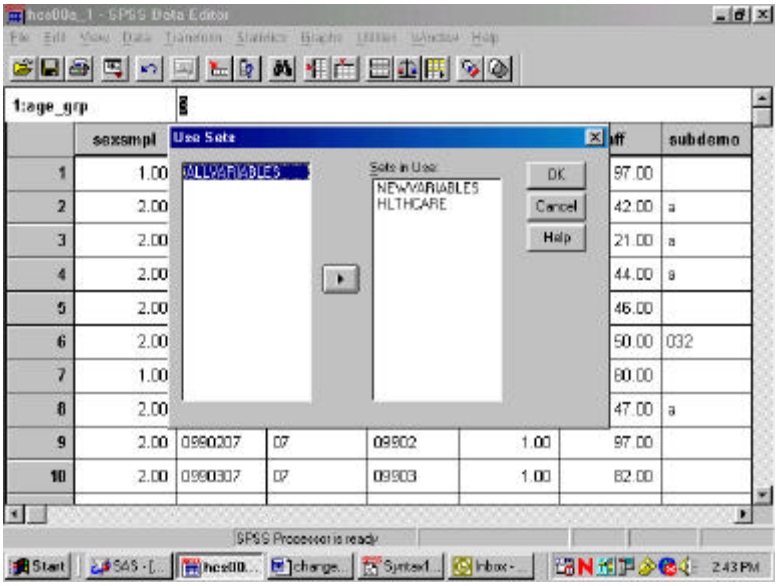
Click on **Add Set** to save the set specifications. The screen will change to the following:



The set is now available for use. To use the set, **Close** the dialog box, reopen the **Utilities** menu, choose **Use Sets…,** and receive this screen:



Move HLTHCARE from the left slot to the right slot, which is labeled **Sets in Use**. Transfer ALLVARIABLES from the right to the left slot. Leave NEWVARIABLES where it is. **OK** saves this change.



Until you change this specification, only nine original variables and any new variables will appear in the dialog boxes associated with procedures.

Limiting the Number of Observations

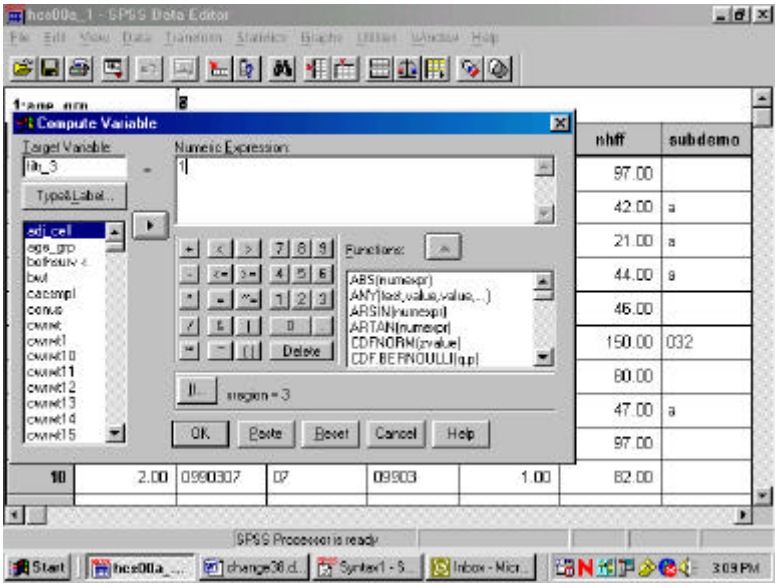
There are many ways to limit the number of observations available to statistical reporting procedures. The method illustrated here involves using **filter variables** with a menu-driven **Filter By** option. Using filters deactivates but does not delete cases from the file. A diagonal line appears next to the filtered cases in the **Data Window**.

The first task is to **compute** a filter variable for all the cases in the file.

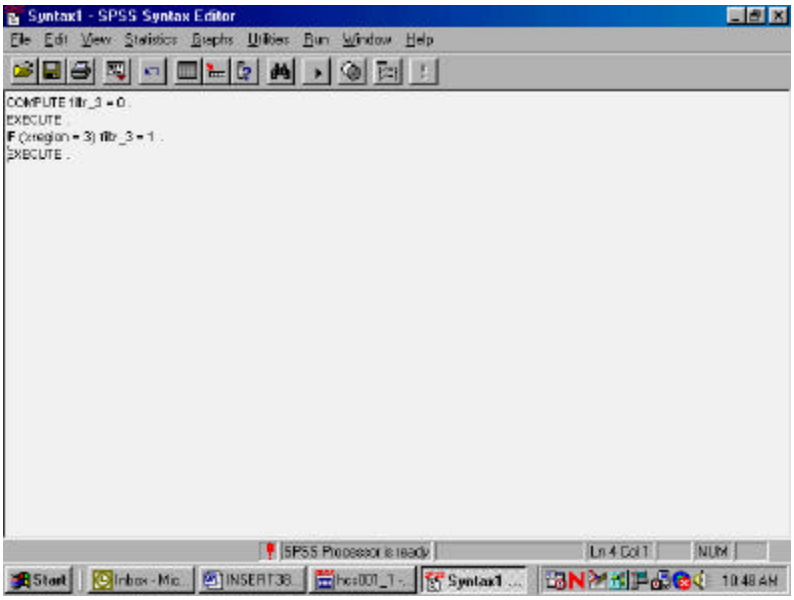
A filter variable has two values: **0** and **1**. The **1** indicates that the case will be included for procedures. The **0** flags the case for removal.

For example, suppose you want to produce a table for people who live in the Southeast, i.e., cases for which the variable **xregion = 3**. You would build a filter variable named **filtr_3**, which has the value **1** associated with the cases in the Southeast and 0 for all the other cases in the file. The logic is: if **xregion** = 3, then **filtr_3** = 1, else **filtr_3** = 0.

The screen below shows the final step in computing the filter variable. The variable was first initialized to **0**. Then, the "If" condition was built for setting the filter variable to **1**. You are now working with a subset of variables, allowing the dialog boxes to be used more efficiently.

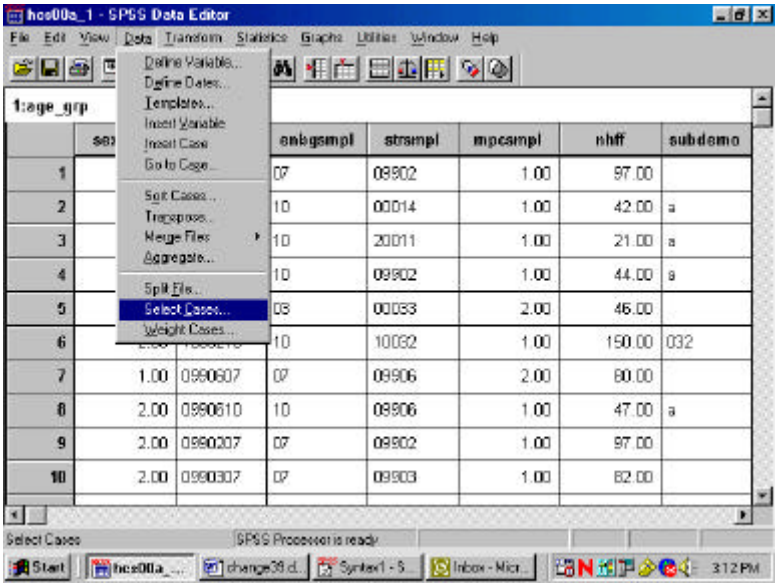


The screen that follows shows the syntax that was generated as you built the variable filtr_3.



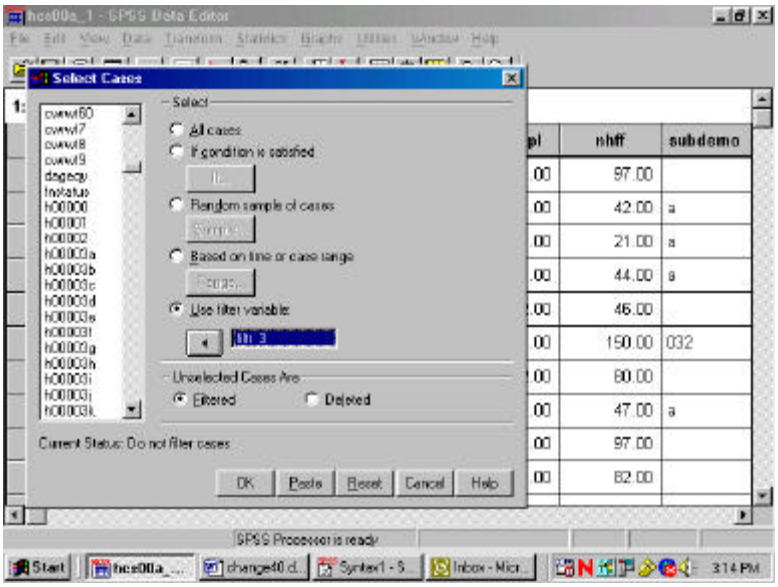
Once you build the filter variable, you can apply it for analyzing only those people from the Southeast.

Using the **Data** menu, choose **Select Cases**.

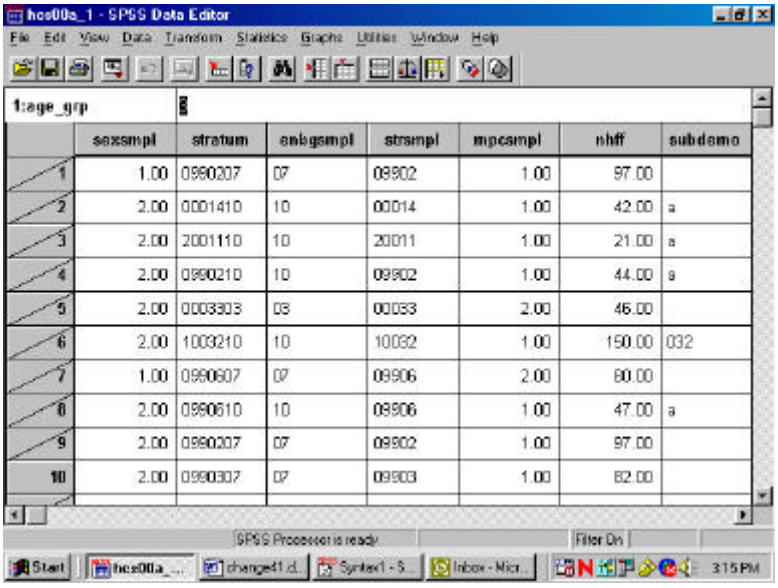


In the dialog box, check **Use filter variable**. Move the variable **filtr_3** from the variable list on the left side of the dialog box into the slot provided, as indicated below. Check that the option **Filtered** is checked under **Unselected Cases Are**. This is the default option.

Click **OK** and exit the dialog box.



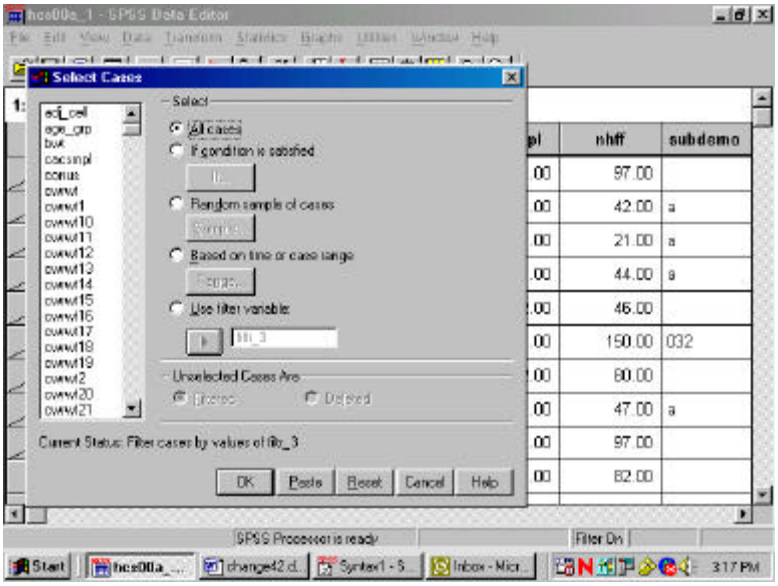
When you return to the **Data Window,** notice the slanting line next to some of the cases in the file. Those cases have been filtered out.



You can now produce tables for the subset of cases.

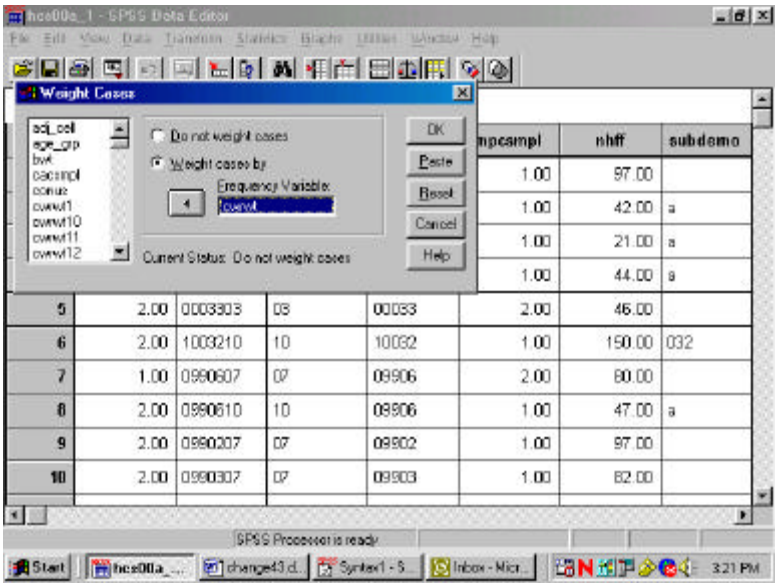
When using filter variables, it is important to check the filter status and to adjust it to fit the present need. Filtered cases are not available for procedures. Moreover, a filter is in effect until it is turned off or until another filter is activated. Check the status line at the bottom of the **Data Editor** window to see if a filter is activated. In the example above, **Filter On** is indicated on the status line. To see *which* filter is active, you must re-enter the **Select Cases** dialog box. There you can deactivate the filter or activate a new one.

To deactivate a filter, choose **All cases** and **OK** as in the screen below.

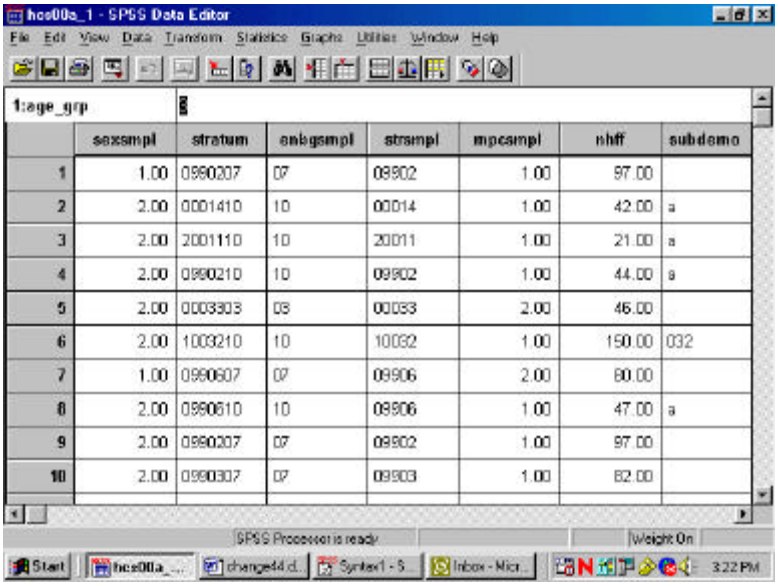


Weighting Data

The data file includes a weighting variable, **CWRWT**, which should be applied to all procedure runs. Again, using the **Data** menu, choose **Weight Cases**. In the dialog box, choose **Weight cases by**. Move the weight variable from the list on the left into the slot labeled **Frequency Variable** on the right as shown below:



Click on **OK** and exit the dialog box. The indication that the data is weighted appears on the status line near the bottom of the screen. As in the following screen, **Weight On** is specified there.



The status line indicates if the data is weighted. Which weight variable is in effect can only be checked by re-entering the **Weight Cases** dialog box. Weighting stays in effect until it is canceled or until another weight variable is activated.

BUILDING TABLES

Building tables starts with creating a new subset of variables that includes H00015, H00056, H00077, cacsmpl, xbnfgrp, xsexa, xregion, xenrllmt, cwrwt, and filtr_3. The procedures **Means** and **Crosstabs** will probably meet most of your statistical reporting needs. SPSS also offers many options for editing the output tables themselves. Some of these options are explained here.

Calculating Means

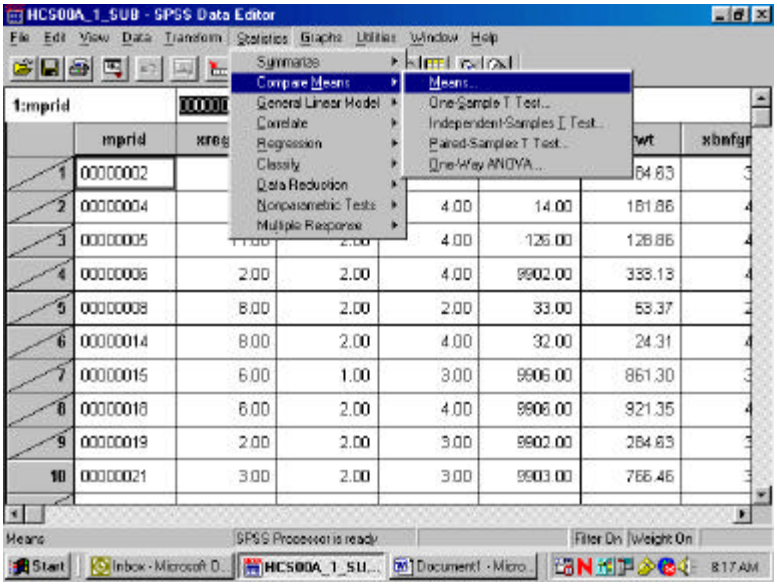
As an example, suppose you want to analyze the health care variables and you want to focus on the Southeast (**xregion** = 3). Suppose you are also interested in overall differences in the mean rating for care received in a military facility as it relates to the beneficiary's self-evaluation of his health for the Southeast region. Within this grouping, you want to examine the effects of the beneficiary group, **xbnfgrp**, and sex, **xsexa**.

The health care variables are **H00056** – rating of the health plan, and **H00077** – assessment of the state of health. The statistic you want to see is the mean of the health care variables for each group in our breakdown.

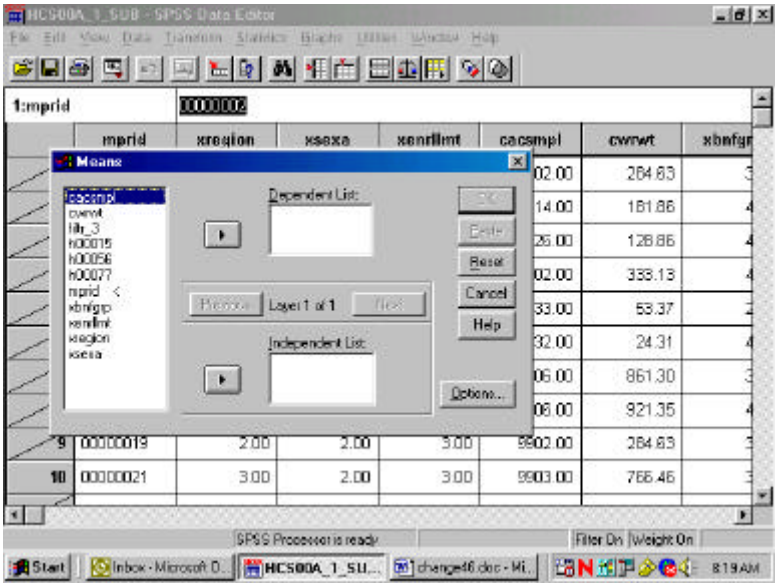
For this analysis, you can use the subset of variables defined above. The subset includes the weight variable, **cwrwt**, which you would activate for procedure runs. The subset also includes the new variable, **filtr_3**, which allows us to select only those cases in the Southeast.

Open the **Data** menu in the **Data Window**. In the **Weight Cases** dialog box, activate the weight variable **cwrwt**. Reopen the Data menu and, in the **Select Cases** dialog box, activate the filter variable, **filtr_3**. On the status line, **Filter On** and **Weight On** should appear.

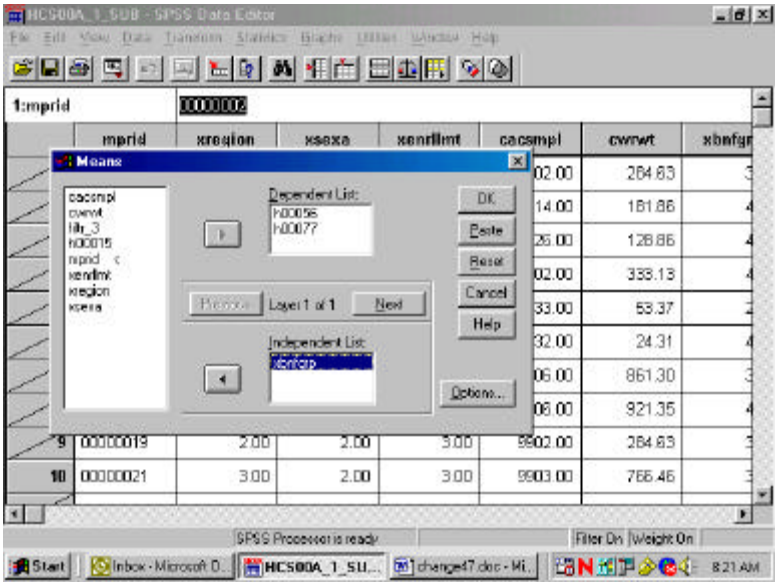
Open the **Statistics** menu in the **Data Window**. Choose **Compare Means** and **Means** from the options as illustrated below.



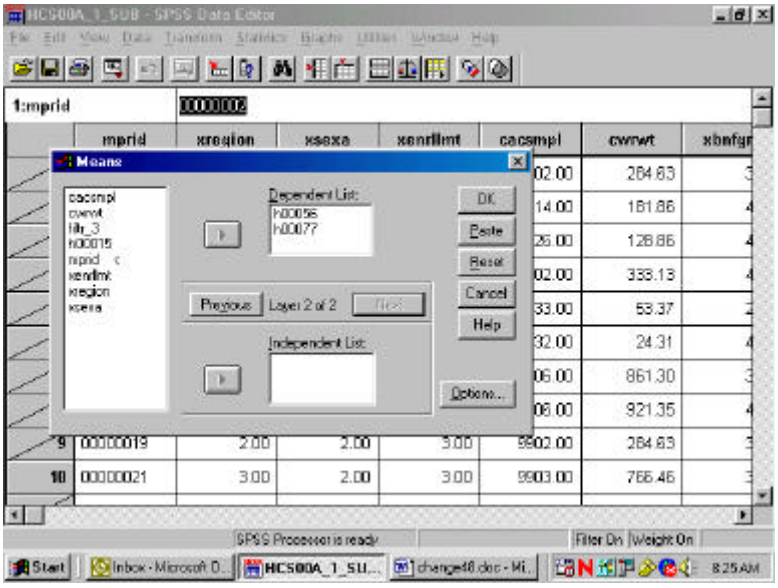
The dialog box for the Means procedure will open as in the following screen:



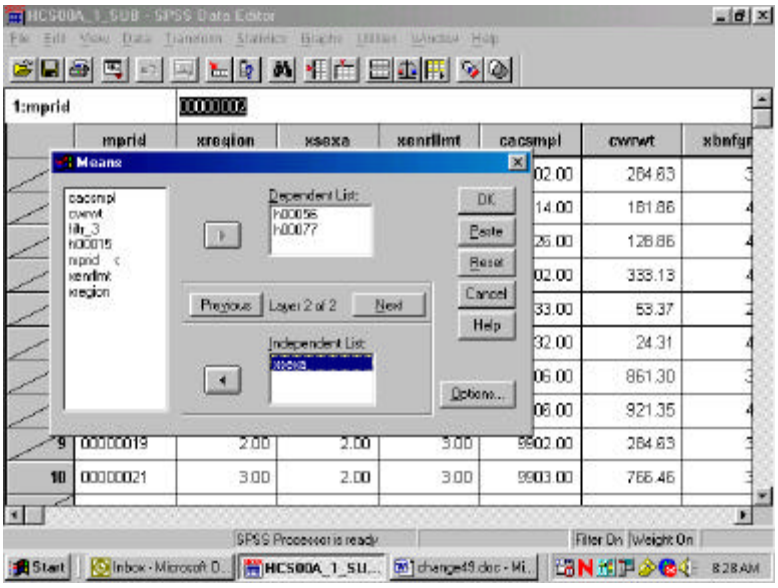
Move the health care variables, **H00056** and **H00077**, from the variable list on the left to the box underneath **Dependent List**. These are the two analysis variables. Notice that **Layer 1 of 1** is specified in the middle of the dialog box. Move **xbnfgrp** from the variable list on the left into the box under **Independent List**. **xbnfgrp** is the first grouping variable. The screen should look like the following:



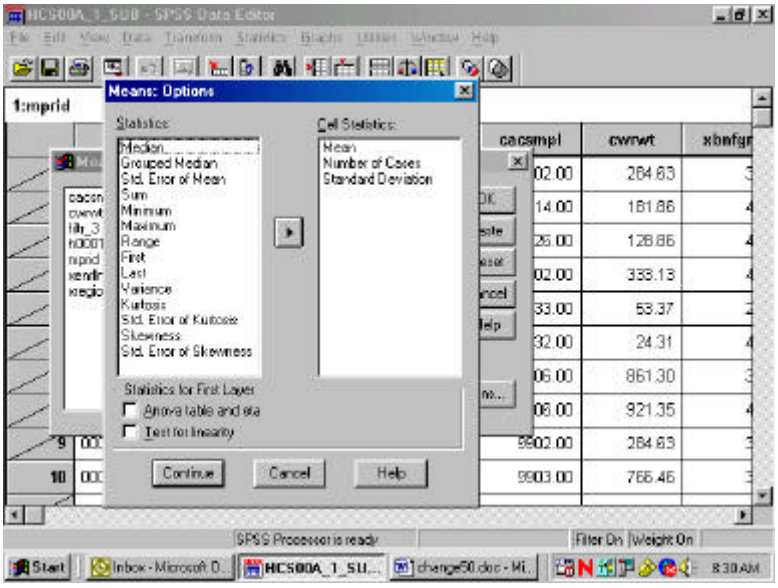
Click on **Nex**t in the center of the box to create a second layer. The following screen will open:



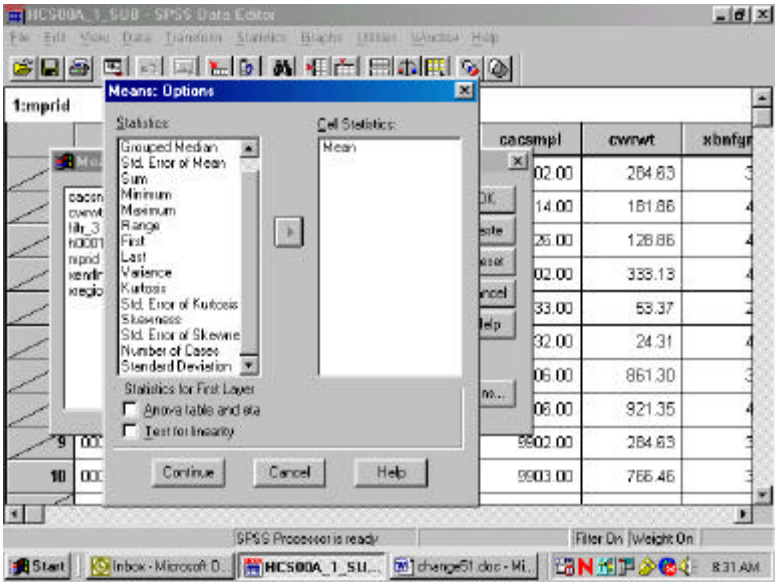
Notice that **Layer 2 of 2** is specified in the middle of the dialog box. Move **xsexa** from the variable list on the left into the box under **Independent List**. **Xsexa** is the second grouping variable. The screen should look like the following:



To set some options, click on **Options** and the following dialog box will open:

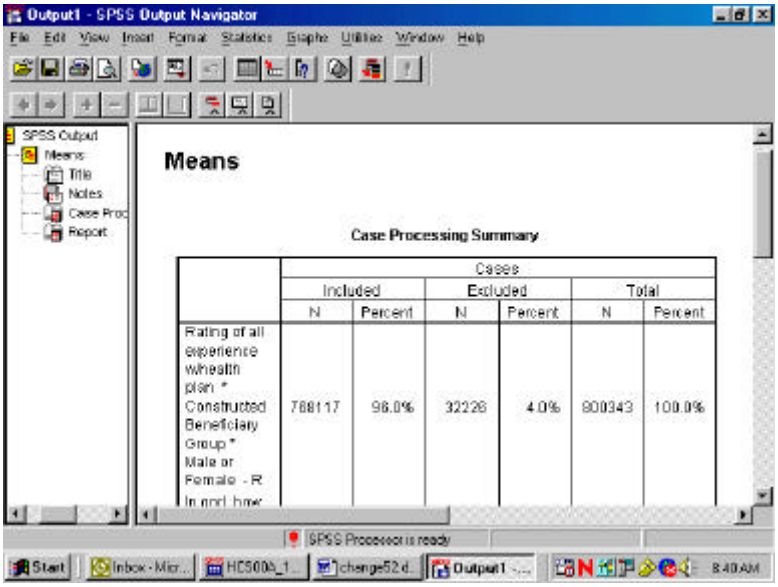


On the left of the box is a list of statistics, under **Statistics**. These are all the possible options for statistical output. In the box under **Cell Statistics** are the default output statistics for the analysis. In this case, **Mean** is the statistic of interest. Highlight **Number of Cases** and **Standard Deviation** and move them to the box at the left, removing them from the analysis, as follows:



Click on **Continue** and return to the previous screen. Click **OK**. The **Means** procedure will run. On the status line, **Running Means** will appear, and a counter for the number of cases processed will be activated.

When **Means** has finished processing, the **Output Navigator** window will open automatically. As the name suggests, the output window is not just for looking at output. A number of options are available for *navigating* through output, moving tables, and even editing the tables themselves.



The output is organized into two sections. On the left side is a navigating tool, which lists the components of the right side, the actual output. In the left pane, **Means** is indicated, and indented under it appear **Title, Notes, Case Processing Summary**, and **Report**. Clicking on **Means** highlights and selects all the elements. Lines appear around these elements in the right pane. The indenting indicates that the elements are hierarchically organized, with **Means** at the top. Clicking on any of the sub-elements selects just that element.

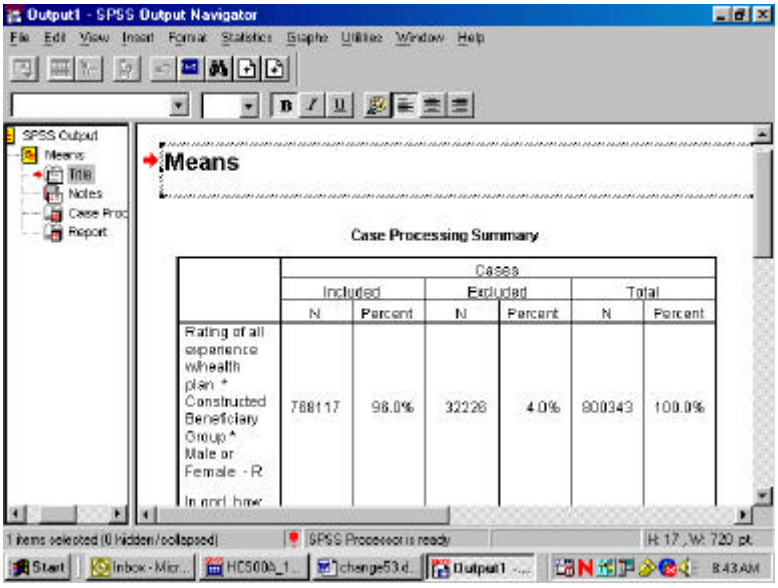
A closer look at the left pane reveals another feature. Hiding underneath the element icons are book icons. The books are either open or closed. If a book is closed, the element is *hidden*. Notice that the book under the **Notes** icon is closed. This is a default SPSS option. Double-clicking the icon will open the book, and the Notes will appear in the output. Double-clicking an **open** book will close it, and the physical element will *disappear* from the output. Closing a book and hiding the element does *not delete* the element.

It is possible to select elements in the right pane of the output. Simply click anywhere inside of the actual output element, and that element will be selected.

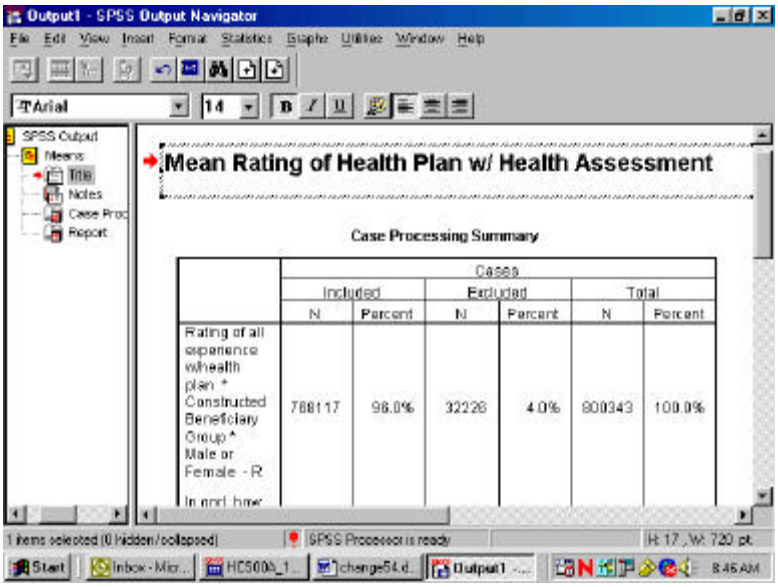
The output may contain many different procedures. The procedure name will be at the top of the list for each section in the left pane. The procedure name does not actually parallel physical output but indicates the category of the output elements.

As you click on each element in the left pane, you will notice that the screen jumps to the actual output of the element, in the right pane. When you click on the procedure name, you jump to the beginning of the next procedure output. This is a quick way to scroll through your output. It also lets you delete, move, and edit selected elements.

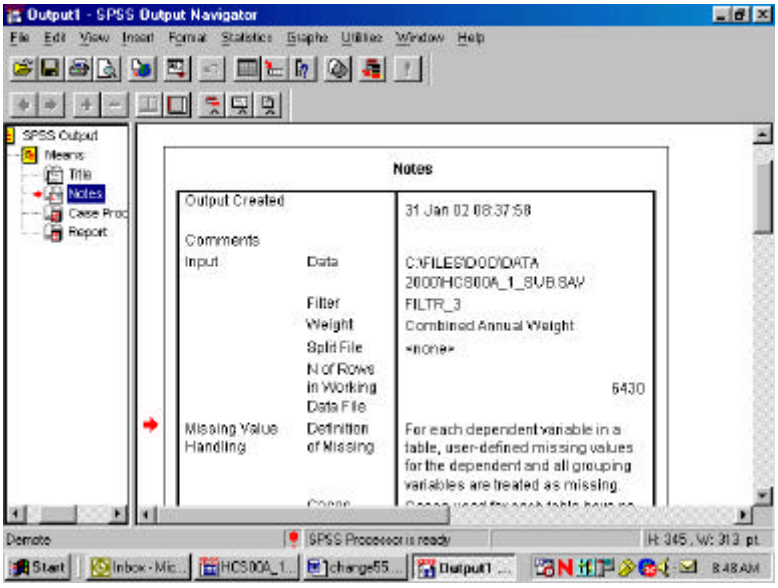
To **Edit** the **Title** element, **Means**, to create a more appropriate title, select the table title by clicking once on the **Title** icon in the left pane. A box now surrounds the title in the right pane. Double-click anywhere within this box, and a box appears around **Means**, as shown in the following screen.



You have entered the **edit** mode for this element, and the cursor appears inside the box. You can delete the word **Means** and write a title that relates to the information in the table. A possible title appears in the next screen. To exit edit mode, click anywhere outside the box. The change you made will be saved.



If you navigate to the next element, **Notes**, you see a closed book. Double-click this item, and the notes will appear as follows:

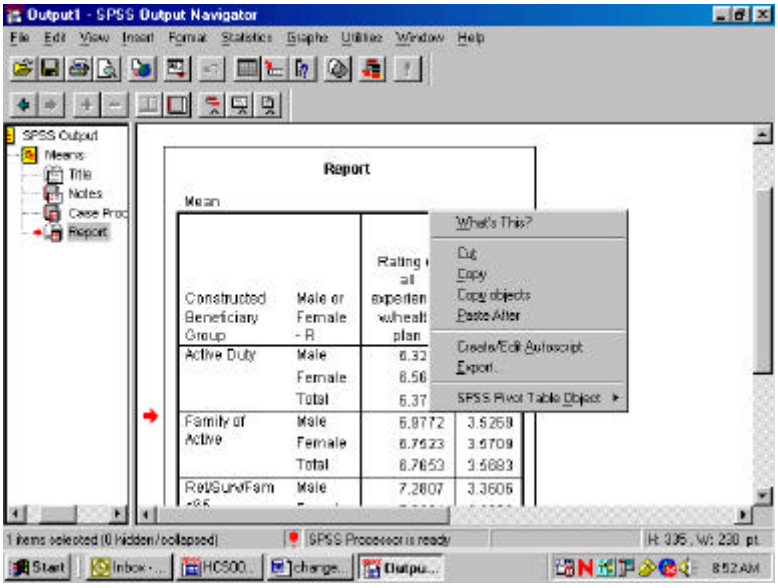


Decide if you want this information to appear in your report. If not, simply double-click the **Notes** icon, and the notes will again become hidden.

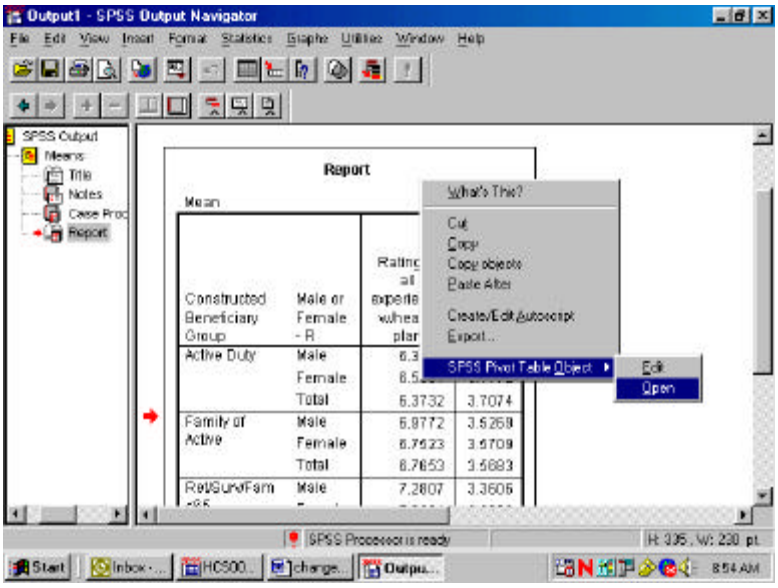
Navigate to **Case Processing Summary**. The table gives useful information about the number of cases included in and the number of cases excluded from a given procedure. This information is important for the researcher but probably not necessary for the report, so you would double click this item to hide it.

Navigate to **Report** to see the actual table output from the procedure **Means**. You can view this table by scrolling through the output. If the table is large, however, scrolling in the output window can be problematic. A better way to review the table is to open it as a **Pivot Table Object** in a special editor.

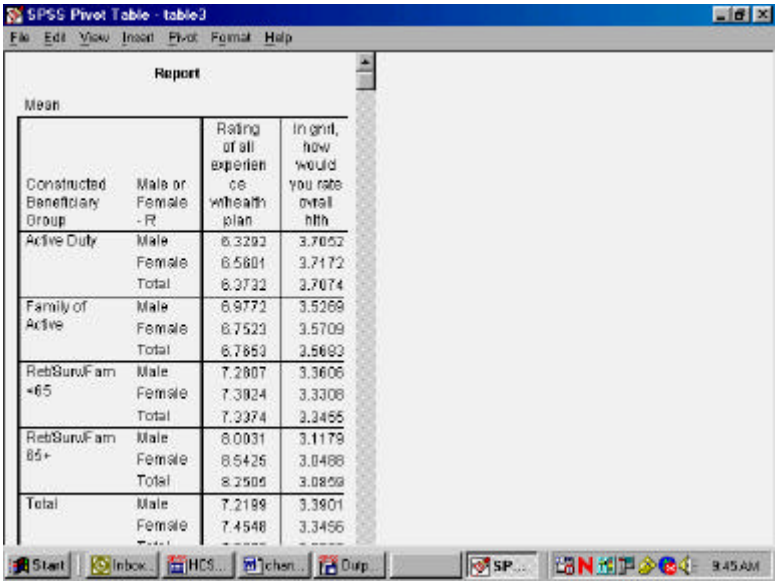
Select the table by clicking the **Report** icon or by clicking inside the table itself. A box will appear around the table. Insert the mouse pointer inside the table and right-click, opening the following dialog box:



Select **SPSS Pivot Table Object** and **Open** as pictured below:

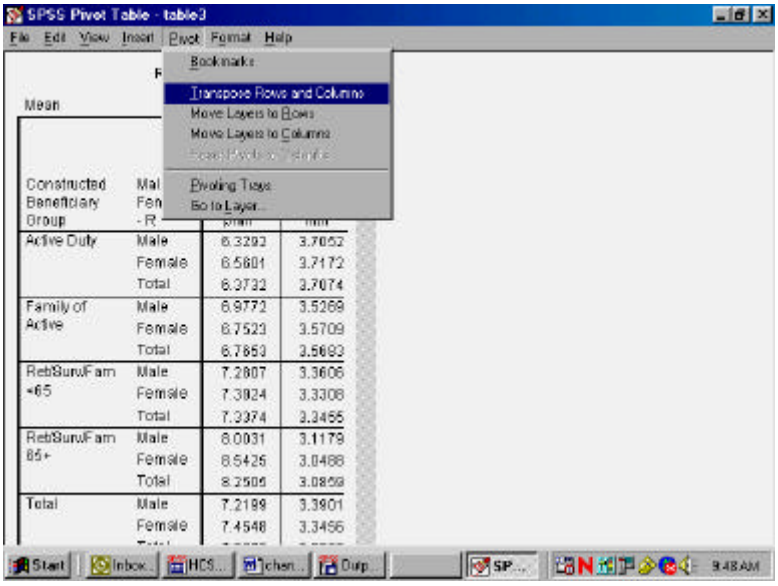


The table will appear in a new screen superimposed on the output. Maximize this screen as shown below.

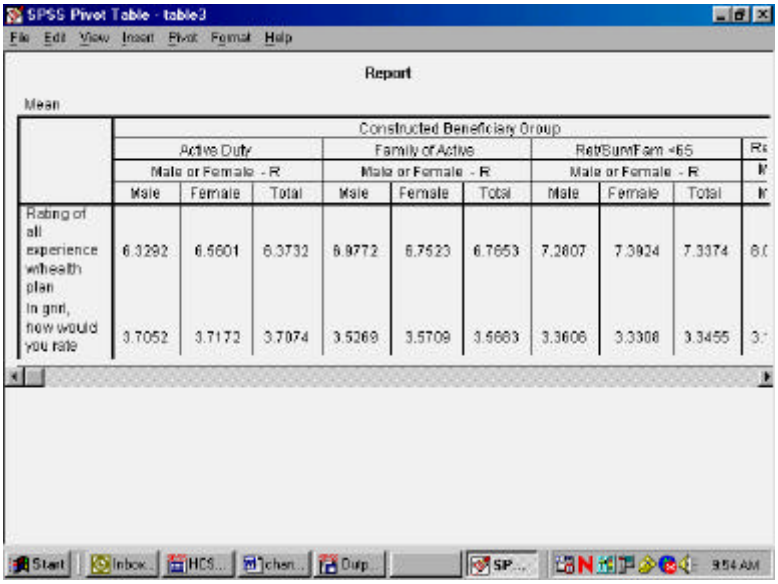


In this special editor, there are many options for formatting the table.

Suppose you want to change the table format from vertical to horizontal. Open the **Pivot** menu in the tool bar and choose **Transpose Rows and Columns** as shown below:

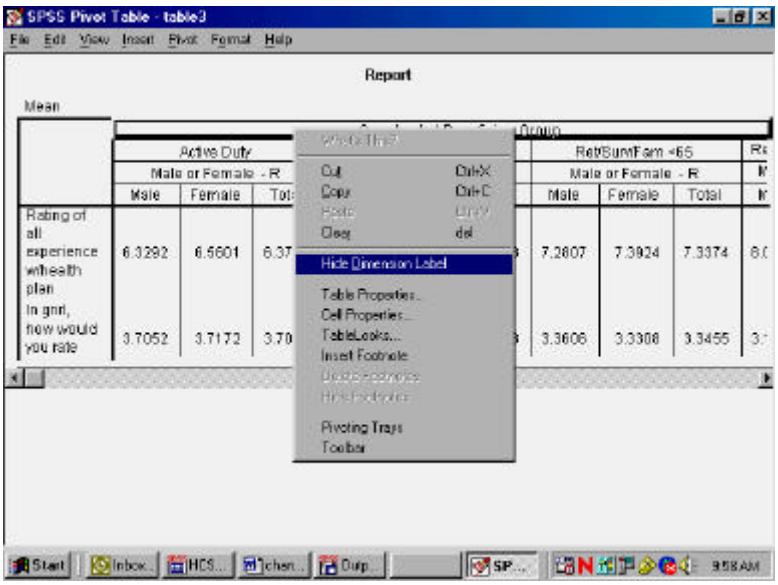


The rows and columns will be reversed as shown in the following screen. Though the table appears too wide in the viewer, it will fit the page when printed. You can do all the table editing in the left section of the table, and the changes will spread through the entire table.

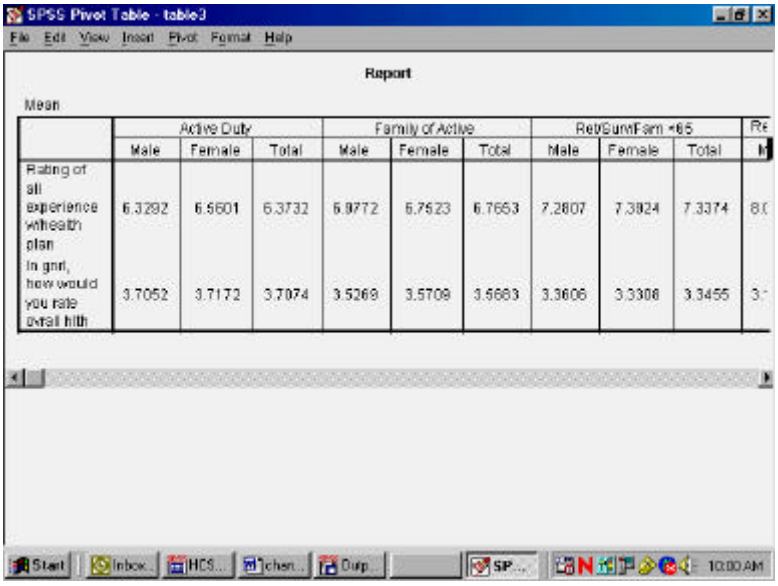


You would then notice that certain labels are redundant. The labels, **Constructed Beneficiary Group and MALE or FEMALE -R** are the **Variable Labels** for the variables. The information in these labels is echoed in the **Value Labels**, which are also reproduced in the table. You would delete the Variable Labels as follows.

Click inside the section of the table where the label, **Constructed Beneficiary Group**, appears. Right-click to open a dialog box, choosing **Hide Dimension Label**, as illustrated below.



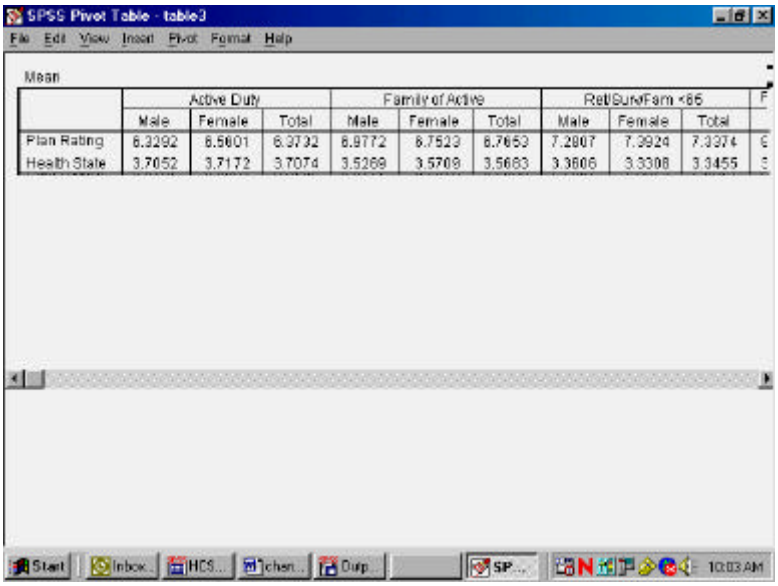
Click inside the table section labeled **MALE or FEMALE -R** and repeat the above procedure. An improved table is shown in the following screen.



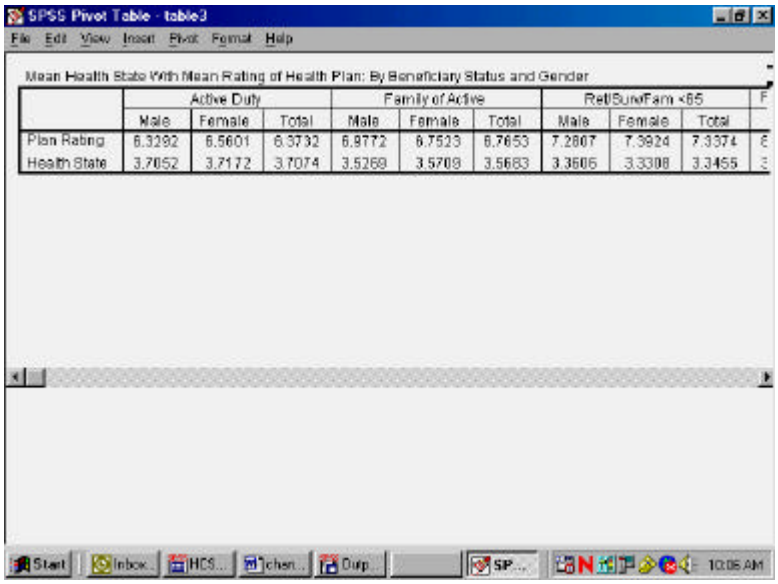
The mean values reported are formatted to allow space for the labels of the satisfaction variables. The spaces between the values are not pleasing to the eye. You can shorten these labels and add the lost information in another place, according to the following procedures:

Double-click on the label for health state. Delete the text, entering only the word, **Health State**. Do the same for the health care label, entering only the words, **Plan Rating**.

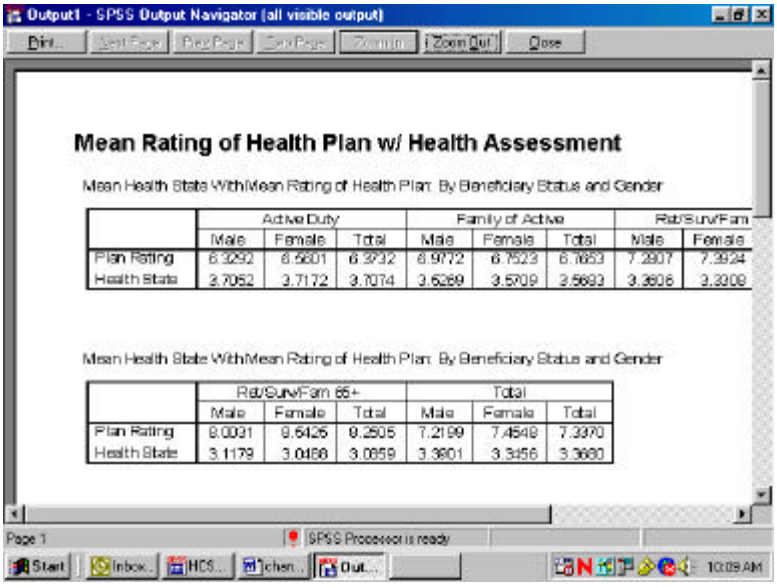
Double-click on the word, **Report**, in the center at the top of the table, right-click, and choose **Delete** from the dialog box.



The resulting table is much more readable. You can then add the deleted information to clarify the table output. Double-click on the label Mean at the top left corner of the table, opening the line for editing. Type in a new title for the table. The final result appears below.



After all the editing changes have been made, exit the Pivot Table editor and return to the output navigator. Click on the File menu and choose Print Preview. Zoom in on the page and review the appearance of the report. The page will appear as the page below.



Calculating Percents

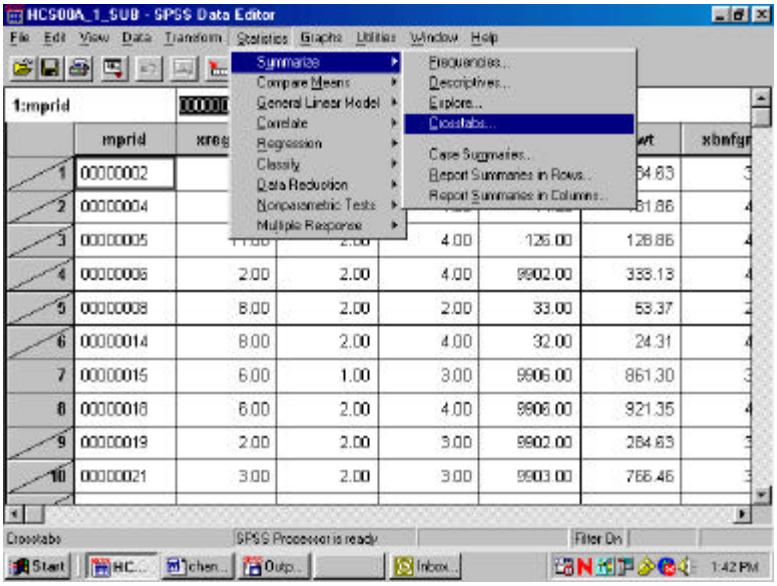
The **Crosstabs** procedure offers many options for analyzing data. The distribution of cases resulting from "crossing" one variable with another is often of interest. The number of cases, row percentages, column percentages, total percentages, and residuals are easily reproduced by **Crosstabs**. A full array of statistics is also available.

The examples given here involve examining relationships between variables, with a view toward the number of cases and the percent of cases in cells produced by "crossing" the variables.

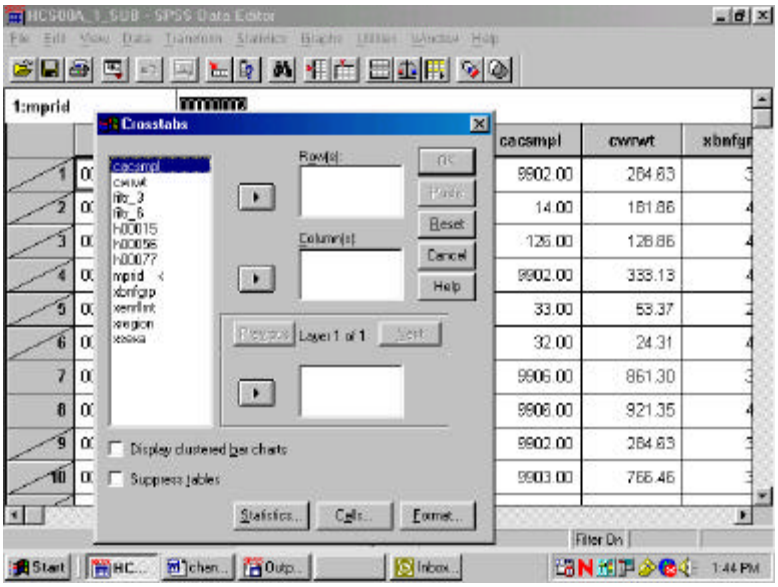
For example, suppose you want to see the percentage of people in the Southwest catchment areas who answered "yes" or "no" to the question, "Did you see a specialist in the last 12 months?" The variables in this analysis are **cacsmpl** – the catchment area, and **H00015** – the question variable. The cases for the analysis are from the Southwest only.

The first task is to build a new filter variable, assigning **1** to the variable when **xregion = 6**. You would call the variable **filtr_6** and build it the same way you built the filter, **filtr_3**. Cases from the Southwest are selected when you activate the filter, and the other cases are filtered out. Check the status line for **Filter On**.

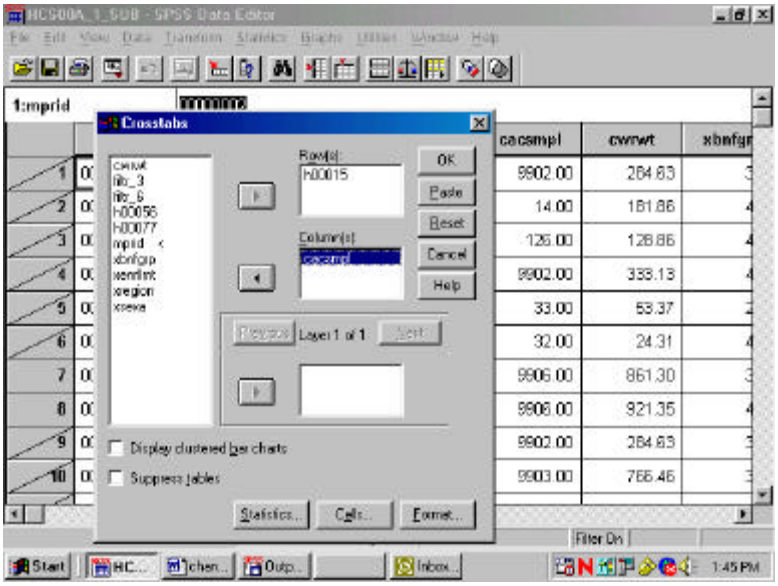
Next, open the **Statistics** menu in the **Data Window**, choosing **Summarize** and **Crosstabs** , as shown below.



The **Crosstabs** dialog box will open as follows:

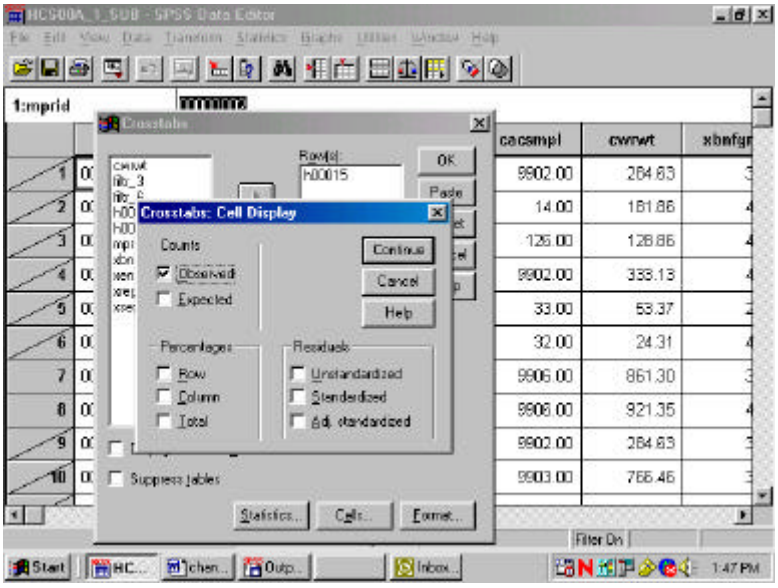


Move **H00015** from the variable list on the left into the box marked **Row(s)**:, and move the variable **cacsmpl** into the box marked **Column(s):**. The screen will resemble the following:



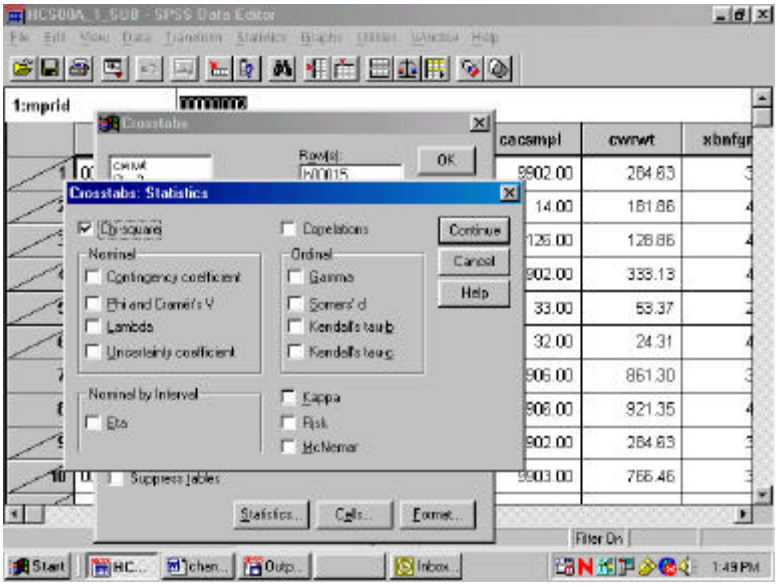
For this analysis, there are no **Layer** variables, so you can proceed to format the table cells.

Click on **Cells...** and open the following dialog box.



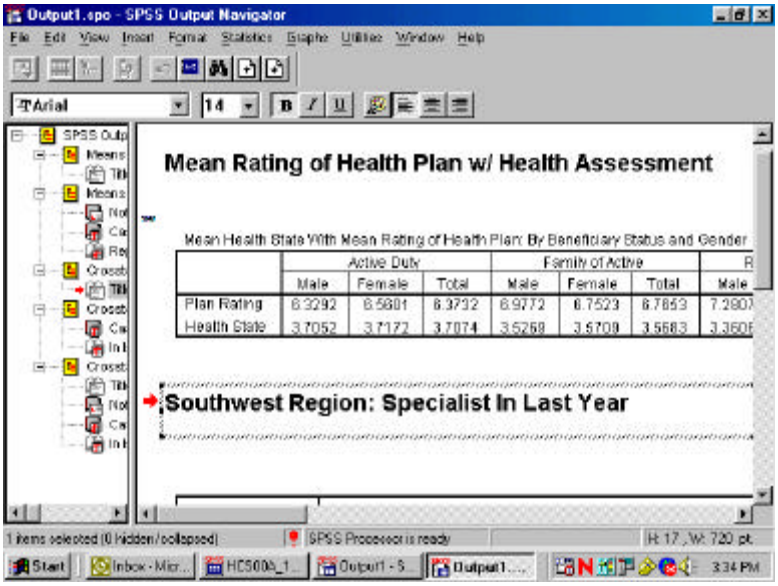
Under **Counts, Observed** is checked. This refers to the cell count, a statistic you want to see, so you would leave it checked. Under **Percentages**, check **Column** because you are interested in the percentage of people in each catchment area. Click **Continue** and return to the original screen.

Suppose you also want to see the chi-square statistic. Click on **Statistics**, and the following screen will open:



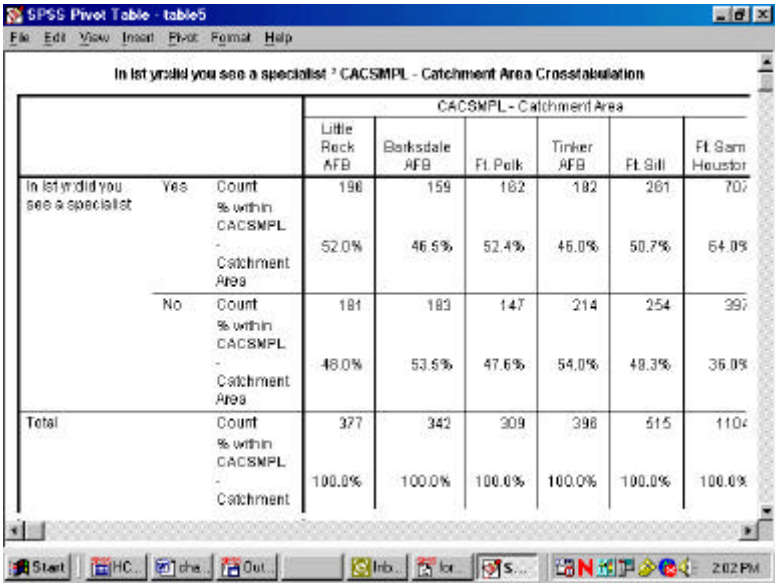
Check **Chi-square** as in the screen above, click **Continue** to return to the first screen, and click **OK** to run the procedure. **Running Crosstabs** will appear on the status line, together with the case counter.

When the run is completed, the output window will open, and you can proceed to reformat the table. For a given work session, SPSS appends new output to previous output--in our case, the **Means** procedure. As shown in the next screen, a second section now appears in the left pane, headed by the word **Crosstabs**. Navigate to the **Title** section and double-click inside the title box to change the text in the box to fit the table, as in the example below.

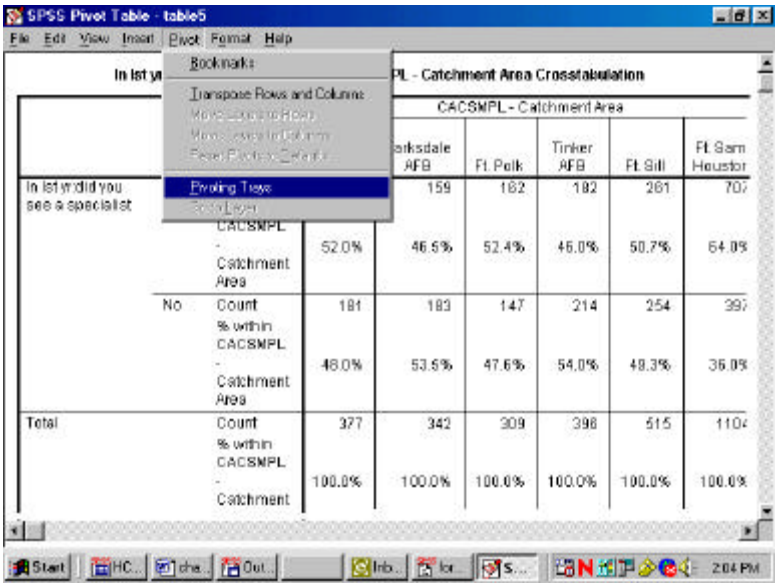


As you did for the **Means** procedure, you would again evaluate the **Notes** and examine the **Case Processing Summary**. Hide the **Notes** and delete the **Case Processing Summary** as you did before.

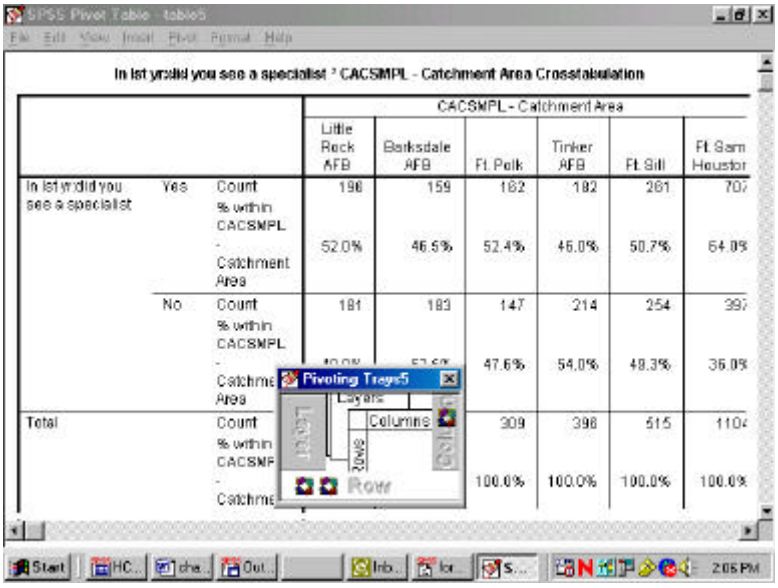
Navigate to the procedure icon. Follow the procedure for opening an **SPSS Pivot Table Object**, open the table in the special editor and maximize the screen as in the following:



The information you requested is in the table, but the table is hard to read. The first possibility is to realign the percent statistic, bringing it into the row dimension. To do this, open the **Pivot** menu and choose **Pivoting Trays**, as in the following screen:

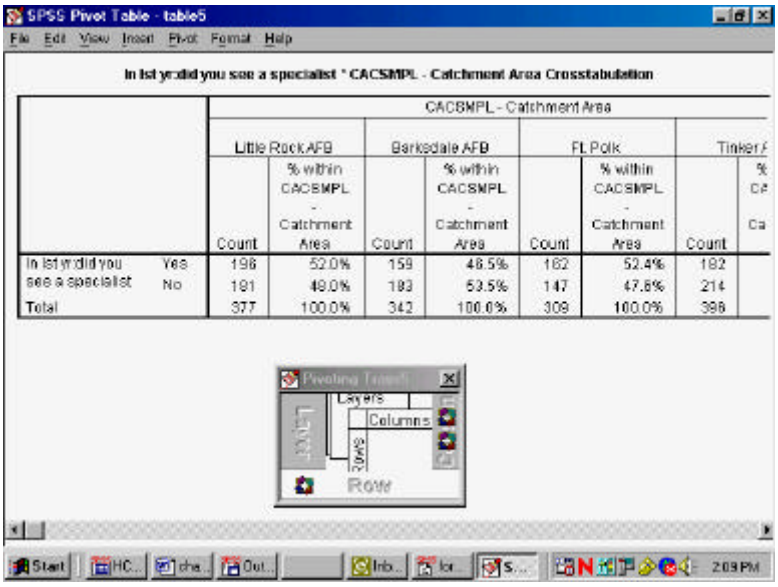


The pivoting tool will appear:



This tool reflects the table structure: rows, columns, and layers. The icons in the margins of the pivoting trays represent the table elements: the variables and the cell statistics. Place the mouse pointer on each icon and notice the element name appear. In this example, on the ROW axis, you would find the variable, **H00015** – saw specialist in the last 12 months, and **Statistics** – the percent of people in each catchment area. On the column axis is the variable, **cacsmpl** – the catchment area.

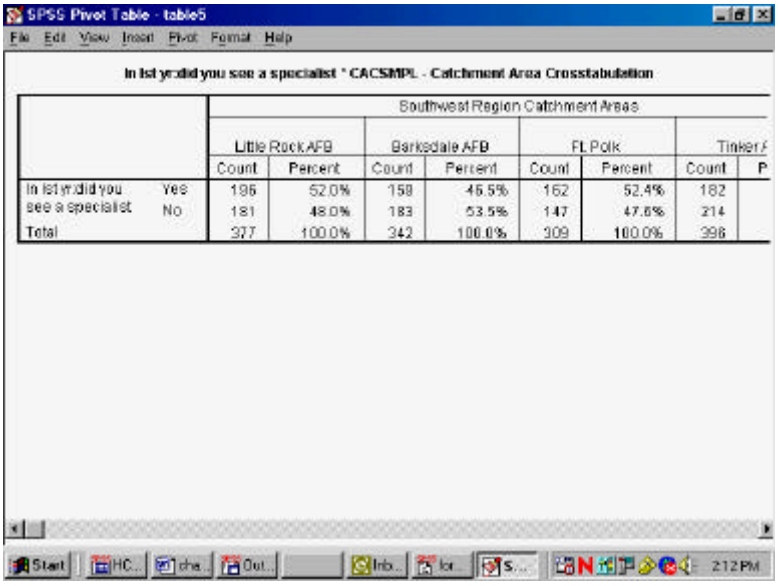
Place the mouse pointer on the **Statistics** icon. Click and drag the icon from the ROW to the COLUMN dimension. The table immediately reformats as in the following screen:



Close the pivoting tool and scroll from side to side in the table. Again, the table appears too wide, but the report will print properly. Notice that the table is much more readable.

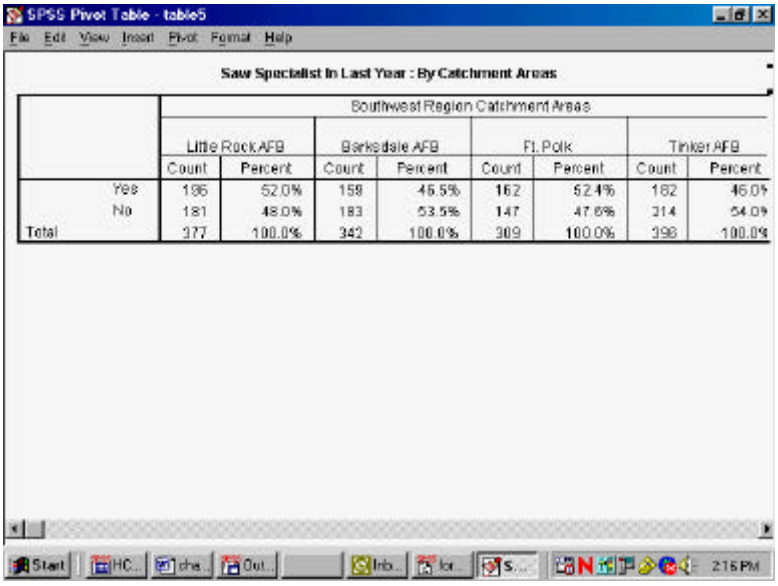
The label at the top of the table is the **Variable Label** for **cacsmpl**. Select it by double-clicking and edit it for clarity (see the screen below).

The table is now formatted to accommodate the long percent label, creating a lot of wasted space. Double-click this element, delete the text, and replace it with the word, “Percent”. The empty space disappears and the table appears as follows:



Next, notice that the label for **H00015** is awkward. Select and clear it.

Last, edit the text in the table label so that it better expresses the content of the table. The finished table appears as follows:

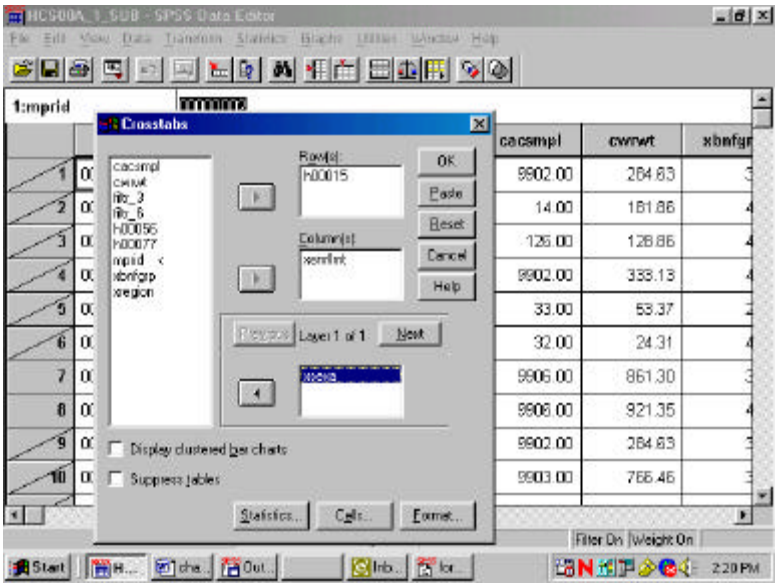


Check **Print Preview** to see if the table is acceptable.

The last example shows you how to add a **Layer** dimension to a **Crosstabs** analysis. Using the same row variable, **H00015**, suppose you want to look at the percentage of people by their enrollment status in TRICARE Prime, **xenrllmt**, who saw a specialist in the past 12 months. Suppose you are also interested in sex differences, **xsexa**, among the groupings. **Xsexa** is the **Layer** variable. You want to remain in the Southwest region, using **filtr_6** as the filter variable. The cases will be weighted by **cwrwt**.

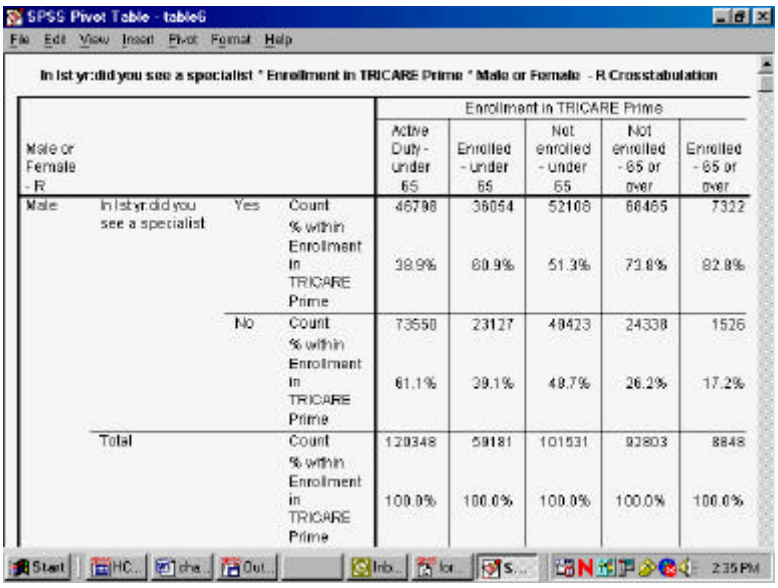
The status line indicates **Weight On** and **Filter On**. Verify that both the weight and the filter variables are appropriate.

Once more, open the **Crosstabs** dialog box, enter the analysis variables, and set the **Cells** options, checking **Column** under **Percentages** until the dialog box looks like the following:



Do the following:

- Run **Crosstabs**.
- Edit the **Title** element in the **Output Navigator**.
- Examine **Notes** and the **Case Processing Summary** to verify that the CrossTab ran as expected.
- Open the table as an **SPSS Pivot Table Object,** and the following will appear:

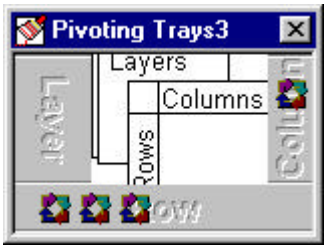


In lst yr:did you see a specialist * Enrollment in TRICARE Prime * Male or Female - R Crosstabulation

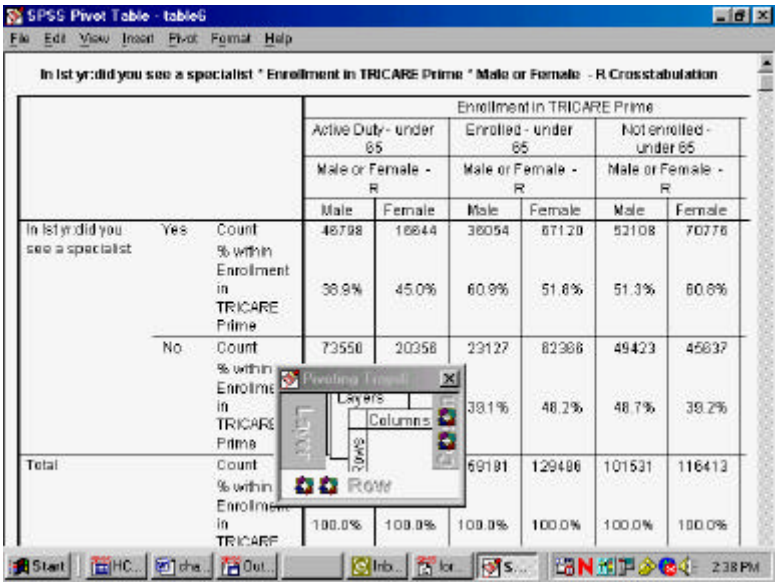
Male or Female - R				Enrollment in TRICARE Prime: Active Duty - under 65	Enrolled - under 65	Not enrolled - under 65	Not enrolled - 65 or over	Enrolled - 65 or over
Male	In lst yr:did you see a specialist	Yes	Count	46798	36054	52108	68465	7322
			% within Enrollment in TRICARE Prime	38.9%	60.9%	51.3%	73.8%	82.8%
		No	Count	73550	23127	49423	24338	1526
			% within Enrollment in TRICARE Prime	61.1%	39.1%	48.7%	26.2%	17.2%
	Total		Count	120348	59181	101531	92803	8848
			% within Enrollment in TRICARE Prime	100.0%	100.0%	100.0%	100.0%	100.0%

The table is difficult to read, but you can improve it by doing the following.

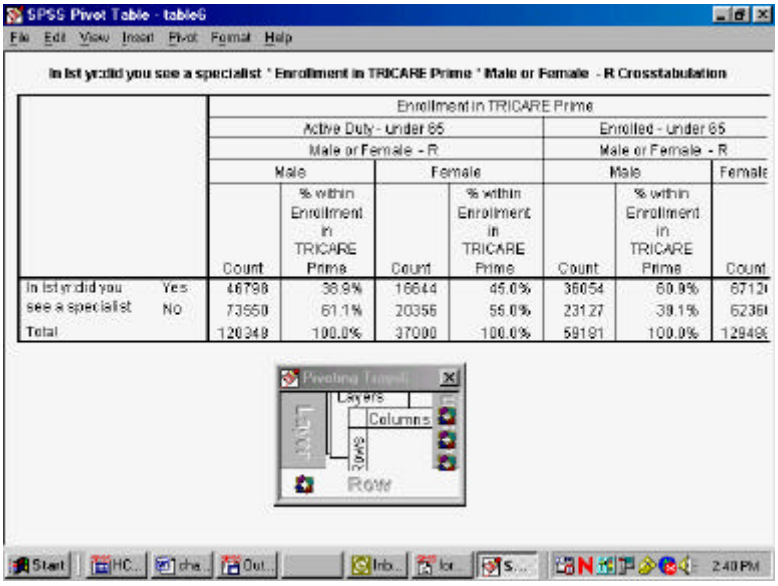
Select the **Pivot** menu to activate the **Pivoting Trays**. The table structure is reproduced in the tool as follows:



Place the mouse pointer on each small icon to find the second grouping variable, labeled **MALE OR FEMALE-R**, in the ROW dimension. Move it to the COLUMN dimension, and the table changes to the following:

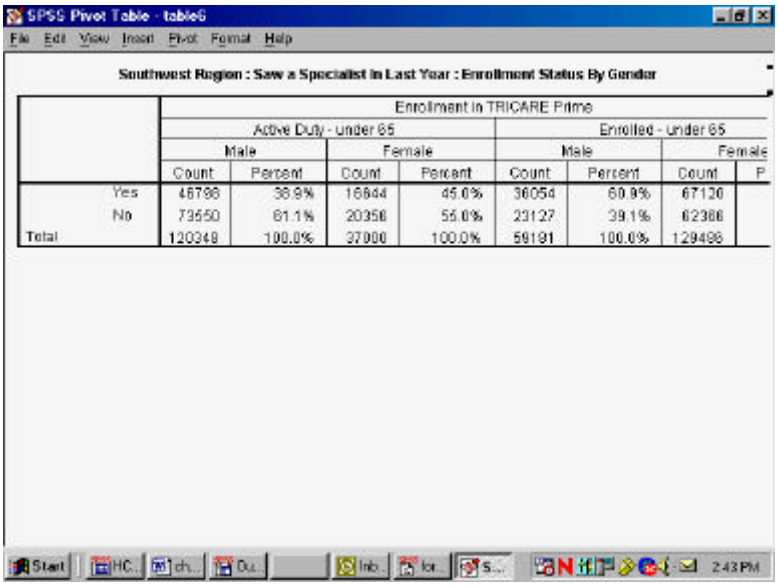


Then drag the **Statistics** icon to the COLUMN dimension to produce the following change:

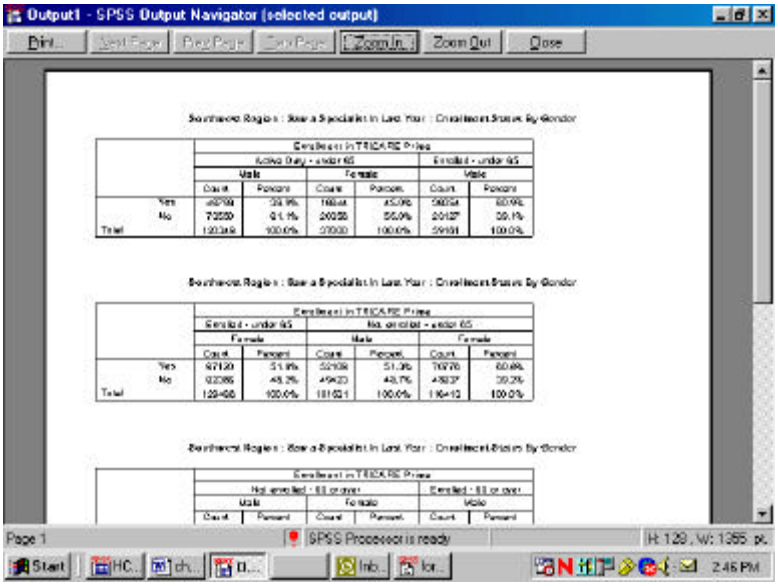


Close the **Pivoting Trays** and hide the dimension label, **MALE OR FEMALE-R**, in the table. Then, change the percent label to "Percent" and delete the label for **H00015** in the row dimension. Last, revise the label above the table to make it more informative.

The resulting table is both clear and informative.



The Print Preview, as in the view below, shows how the report will print.



CALCULATING VARIANCES OF ESTIMATES

Sampling error occurs when estimates are derived from a sample rather than a complete census of the population. The sample used for a particular survey is only one of a large number of possible samples of the same size and design that could have been selected. Even if the same questionnaire and instructions were used, the estimates from each sample would differ from the others. The standard error (or square root of the variance) indicates the magnitude of the sampling error and thus measures the precision expected from a particular sample.

It is desirable to assess the accuracy of an estimate. The standard error of a survey estimate measures the precision with which an estimate from one sample approximates the true population value. The standard error can be used to construct confidence intervals for survey parameters, within which the true parameter lies within a measurable degree of certainty.

This section explains how to estimate standard errors or variances for estimators computed from the 2000 Adult HCSDB. For a full discussion of variance estimation methods, see Wolter (1985) and references cited therein.

Variance Estimation Methods

To account for the sample design,[1] it is customary to use either Taylor series linearization or a resampling method for variance estimation. Neither variance estimation method is, in general, better so the choice of one or the other is largely a matter of convenience. To help users to estimate standard errors using Taylor series linearization or jackknife replication, the public release files for the 2000 Adult HCSDB include the following variables:

- The stratum variable and the final annual (ADJ_CELL and CWRWT) weight for the Taylor series linearization method
- Jackknife replicate annual weights (CWRWT01 to CWRWT60) for the jackknife replication method
- Quarterly final weight (WRWT) and jackknife replicate weights (WRWT01 to WRWT60)

Two popular software packages are available for performing Taylor series linearization or the jackknife replication method: SUDAAN™ (Shah et al. 1997) and WesVarPC (Brick et al. 1996), respectively.[2] The discussion below explains how SUDAAN and WesVarPC are used to calculate variance estimates using Taylor series linearization and jackknife replication methods.

[1]The 2000 HCSDB uses a stratified sampling design. For details, see N.A. Clusen and D.S. Jang. "The 2000 Health Care Survey of DoD Beneficiaries: Quarter One Adult Sample Design." Washington, DC: Mathematica Policy Research, November 2000.

[2]The latest version for SUDAAN 7.5 and SAS 8.0 can be used for replication methods including jackknife variance estimation.

Taylor Series Linearization Method

For most sample designs (including the 2000 Adult HCSDB), design-based variance estimates for linear estimators of totals or means can be obtained with explicit formulas. However, nonlinear functions such as ratios do not have exact expressions for the variance. The Taylor series linearization method approximates the variance of a nonlinear estimator with the variances of the linear terms from the Taylor series expansion. Woodruff (1971) presented applications of this technique to sample surveys. Details on this method can also be found in "The 2000 Health Care Survey of DoD Beneficiaries: Adult Technical Manual".

To calculate variance estimates based on Taylor series linearization method with HCSDB's stratified sampling design, both the stratum variable (ADJ_CELL) and the final weight (CWRWT) specified for each data record are needed. The public release files for the 2000 Adult HCSDB include these variables: ADJ_CELL and CWRWT.

SUDAAN incorporates the final analysis weight and the survey design to obtain estimates and their sampling errors. With a small overall sampling rate of about 1 percent, you can use the with-replacement design procedure (STRWR) in calculating standard errors.

All SUDAAN procedures require the following:

- The specification of sampling designs. The terminology for the stratified with-replacement sample design is DESIGN = STRWR.

- The data file sorted by the variable specified in the NEST statement. For the 2000 Adult HCSDB, the data file for adults must be sorted by ADJ_CELL before using any SUDAAN procedure.

- A FILE TYPE appropriate for SUDAAN, if you use a stand-alone SUDAAN program. For example, some SUDAAN PC versions under Windows or MS-DOS accept only V6.02 through V6.04 SAS files, and FILE TYPE must be specified as SAS. SAS-callable SUDAAN is also available and can be invoked directly in a SAS program with any available SAS file as input; FILE TYPE is not needed here.

- The WEIGHT variable is CWRWT

The following program is an example of how to use SUDAAN to calculate variance estimates for a mean statistic. Suppose you want to estimate:

- H00016 among all beneficiaries in the past 12 months who saw a specialist (H00015=1) for each region (XREGION)

```
PROC DESCRIPT DATA=HCSDB /*FILETYPE=SAS*/ DESIGN=STRWR;
WEIGHT      CWRWT;
NEST        ADJ_CELL;
SUBPOPN     H00015=1;
SUBGROUP    XREGION;
LEVELS      16;
VAR         H00016;
```

The following program is an example of how to use SUDAAN to calculate variance estimates for column percentages or row percentages. Suppose you want to estimate:

- A cross tabulation of respondents in region 3 who last had a blood pressure reading less than 12 months ago, 1 to 2 years ago, and more than 2 years ago (H00062) by TRICARE enrollment (XENRLLMT).

```
PROC CROSSTAB DATA=HCSDB /*FILETYPE=SAS*/ DESIGN=STRWR;
  WEIGHT      CWRWT;
  NEST        ADJ_CELL;
  SUBPOPN     XREGION = 3;
  SUBGROUP    H00062 XENRLLMT;
  LEVELS      3 5;
  TABLES      H00062 *XENRLLMT;
```

From the above examples, users should note that:

- PROC DESCRIPT can be used to compute estimates of means and the corresponding standard errors.

- PROC CROSSTAB can be used to compute estimates of proportions and the corresponding standard errors.

For a more detailed and complete discussion of how to use SUDAAN, see Shah et al. (1997).

Jackknife Replication Method

Another popular way to estimate the variance is to use a resampling method such as jackknife replication, balanced repeated replication, random groups, or the bootstrap method. Like other replication methods, jackknife replication constructs a number of subsamples (replicates) from the full sample and computes the statistics of interest for each replicate (with the same formula as the full sample estimate). The mean square error of the replicate estimates around their corresponding full estimate provides an estimate of the sampling variance of the statistic of interest regardless of the functional form of the statistic.

There are 60 replicate weights (CWRWT01-CWRWT60) for the 2000 Adult HCSDB in the combined annual public use file. Construction of these weights is described in the Adult Technical Manual. With the replicate weights, you can produce jackknife standard errors using in-house or custom written software, or you can use a publicly available software package such as WesVarPC or SUDAAN 7.5. Because WesVarPC 2.02 is available as freeware on the World Wide Web (http://www.westat.com/wesvarpc/index.html), the following example explains how it is used to produce jackknife variance estimates for statistics from the 2000 Adult HCSDB.

Suppose you want to estimate the mean rating of specialists (H00016) by beneficiaries who went to a specialist in the past 12 months (H00015=1) for each region (XREGION). You would use WesVarPc as follows.

- **Create a SAS V6.04 file, SAS Transport file, or ASCII file.** WesVarPC has a restriction for the input data format. All files must be converted to one of these three types of files before being imported to WesVarPC.

- **Create a WesVarPC data file.** From the ***Prep*** menu, choose the ***Import Data Files*** screen and import all variables for the analysis. For this example, input H00015, and XREGION into the ***Variables*** box, WRWT01-WRWT60 into the ***Replicates*** box, and MPRID into the ***ID*** box. Also specify the replication method as JK1 on this screen.

- Create a data file for the subpopulation. Specify the subpopulation by choosing the *Subpop WesVarPC Data File* from the *Prep* menu: H00015=1.

✍ **Calculate estimates.** From the ***Tables*** menu, choose ***New*** and select the file created from the above procedure. Then, from the ***Table Request*** screen, specify H00016 as the ***Analysis*** variable, MEAN (H00016) as the ***Compute Statistics***, and XREGION as the ***Table***.

The above steps can also be followed to produce standard errors. The WesVarPC user's manual (Brick et al. 1996) provides other possible methods for producing standard errors. The latest WesVarPC 4.0 is no longer freeware and can be purchased from Westat.

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